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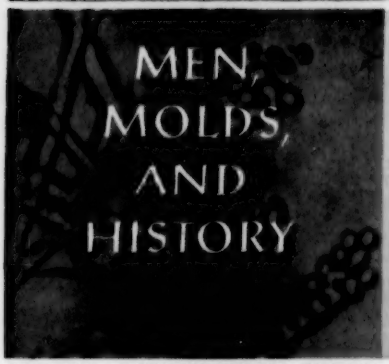

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In Search of Bases of Psychobiology

Psychopharmacological and Psychiatric Notes

Henri Laborit

LABORATOIRE CENTRAL, HÔPITAL MILITAIRE DU VAL-DE-GRÂCE
PARIS, FRANCE

It may seem presumptuous for one who is not a psychiatrist to venture into a field that is not his own. But if we accept a certain unity in the phenomena of nature, it is our duty to propose syntheses if they can be fruitful and can bring some coherence to facts taken from different sources. We have here no pretense of being complete and definitive, but perhaps this paper may lead to the comprehension and the therapeutics of certain syndromes in psychiatry, in the concrete meaning of these terms and not in a personal and abstract sense.

COMPLEXIFICATION

There is little doubt for the physicist, the chemist, the paleontologist, or the naturalist that matter, in the process of complexification, has advanced from simple bodies with molecules that are more and more complex, to nucleoproteins, then to the first unicellular living beings, and finally, after a long and complex evolution, to mammals and to man. The notion of evolution can no longer be regarded as only a theory, but is a statement of fact, which is the organic and temporal linking of living beings in their successive appearances on earth. Therefore, it is important for us to understand the general theme on which nature has amplified in order to know how it is applicable to man.

Everyone knows that on the atomic scale, there is a disordered agitation of matter. In this disorder, only the statistical laws allow us to predict with any degree of probability the possible associations. This is the rule of chance. The nucleoprotein molecules, already a considerably complex form of matter, are born from the chance of this disordered activity of matter on the atomic scale.

It seems to us essential to understand thoroughly that with complexification,

there appears also a certain order, for the arrangement of the atoms in molecules creates an electric field, a magnetic area that directs the less complex matter around it and brings order into the midst of disorder. It is then that the determinism of the laws of classical physics, which was the only branch of physics available for observation as recently as a few years ago, inevitably springs up from the phenomena of mass, from the great number of indeterminate particles that serve as substratum material. In passing, therefore, from observation of the atom to that of the molecule, the determinism appears to emerge from indeterminism, order from disorder.

INDIVIDUALIZATION

This necessary tendency to complexification that results from the disordered activity of matter on the atomic level can lead to and give birth to increasingly complex structures only through the individualization of "bits of complexified matter."

A tissue culture that, theoretically, might in a few hours attain the volume of the earth actually cannot do so because its complexification is possibly only from less complex matter with which it must remain in contact. It seems logical that this would be the case also on the molecular scale. It is as difficult to imagine a cell having the dimensions of a steer as a molecule having those of an ameba, for at the heart of the molecule, as at the heart of the ameba, the maintenance of complexification is possible only by exchanges with the complex surrounding medium. Therefore, these exchanges are accomplished by the surface, which increases only as the square of the dimension when the volume, which regulates the needs, increases as the cube of the dimension.

These bits of complexified matter will be therefore limited to a certain order of size, which, after the molecule, will be that of the cell and then of the entire organism, passing from one to the other form by quantitatively defined bonds that suggest an analogy with the idea of the quanta on the atomic scale.

AUTOREGULATION

Here, then, are bits of complexified matter submitted on the one hand to the second law of thermodynamics, the tendency to equalization, disorder, chance, and maximum entropy, and on the other hand submitted to the consequence of this disorder, that is to say, to complexification. These pieces of matter cannot find a balance between the two tendencies except in a system of autoregulation that will maintain a certain degree of complexification in spite of the tendency to equalization. We shall study one of these forms on the cellular scale, the form that our specialization permits us to explore best.

We must first point out that the scheme we shall describe on the level of the cell is on the basis not of hypothesis, but solely of acquired facts. We shall follow the personal synthesis of these facts, which may be considered hypothetical and which are difficult to demonstrate. This hypothesis, beyond the fact that it is based on solid facts of observation, permits us to explain many mechanisms that are incomprehensible otherwise and it thus gains in validity. It is, in our opinion, essential to understand this hypothesis thoroughly, for it constitutes, we believe, the general

scheme of a mechanism employed by nature on all scales of observation; we will rediscover this cybernetic play in the following stages of complexifying evolution, particularly in the mechanism of the acquiring of consciousness.

CELLULAR AUTOREGULATION

It is known that the cellular membrane, the contact between complexified living matter and the less complex inert extracellular medium, is polarized. This polarization results from the difference in ionic concentration on each side of the membrane, the intracellular medium being rich in potassium ions and the extracellular medium, in sodium ions in particular. Therefore, the simple tendency to equalization tends constantly to cause the potassium to go out and the sodium to come in, in order to equalize the concentration. This, moreover, is what leads to the death of the cell. If the difference in ionic concentration persists, the processes of oxydoreduction and cellular complexification lead to the constant reintegration of the potassium ion on the interior and the rejection of the sodium ion. This is the result of the functioning of the sodium and potassium pump of Hodgkin. It appears evident, moreover, that this ionic phase of the problem is only one aspect of the phenomenon, but it has the advantage of being more easily studied.

Polarization of the membrane regulates its permeability and, through this, the intensity of the exchanges between the complex protoplasmic motor and the extracellular medium.

Let us suppose that the membrane is depolarized by contact with an exterior charge or energy. The permeability increases. The intensity of the metabolic processes increases (e.g., the increase in potassium concentration of the liquid containing a tissue culture increases the intensity of the oxydative processes and the consumption of oxygen). The result of this increase in the metabolic processes is the reintegration of the potassium and extrusion of the sodium, and hence the repolarization of the membrane. Therefore, the repolarization diminishes the exchanges, lowers the metabolism, lessens the polarization, and so on.

In summary, polarization of the membrane regulates the permeability of the membrane and, through this, the intensity of the exchanges and therefore the intensity of the metabolism. It is the intensity of the metabolism that regulates polarization of the membrane. One can imagine therefore that, thanks to this autoregulated system, the cellular protoplasm can retain a certain complexification in the less complex medium in which it lives and from which it derives also the materials necessary for complexification.

CELLULAR AUTONOMY

From this autoregulated balance between chance and determinism is born, on the cellular scale, an indetermination of the second degree. The cell is not entirely determinate, not entirely submitted to the laws of classical physics, since it maintains its complexification in a dynamic manner at a certain level, against the indeterminism of the tendency to equalization. One might therefore say that from the equilibrium between determinism and indeterminism, the cell draws a certain very slight degree

of liberty. We mean by that only the emergence of a new property, born of autoregulation, a property without visible material support under the microscope, but expressing a functional state closely linked to the matter.

It is possible that between the inert molecule and the cell, certain living elements occur that constitute an intermediate cell such as the viruses. Our knowledge about them is too limited for us to be able to consider the form that autoregulation may take on their level.

What we can say is that "life" can be conceived of only as a relationship between the cell and the medium and not as a cell considered alone. It can be conceived of only on the basis of exchanges between the complexified protoplasmic medium and the inanimate medium. Without these exchanges, there is no complexification possible and no maintenance of this complexification. Finally, without autoregulation, there are no exchanges, but a tendency to equalization.

It is doubtless trite to speak of the autoregulation of living phenomena. We have just attempted to demonstrate the mechanism of this autoregulation on the cellular scale, and although we are conscious of the awkwardness of this approach, we nevertheless think that it leads to a means of understanding, with valid facts, how it is possible that an indetermination enters into molecular determinism and how the autonomy of living matter is possible.

The complexification, which has departed from the atom and has led us to the molecule and then to the cell, can progress from this point only by the combination of cellular units, from these "quanta" of living energy. This is the origin of pluricellular beings.

THE ACQUIRING OF CONSCIOUSNESS

We can expect, on the level of superior complexification, the emergence of a new property. This will be reflective consciousness. Let us see on what material elements it may be reasonably constructed.

Several facts appear certain. The structural richness and the anatomical complexity of the human brain and its enormous relative volume undoubtedly have a relationship to the psyche of man. There is evidence of a fragile, but real, union between the psyche and living matter. Another undisputed fact is that any reflected act tends to become unconscious; and that the human brain, which is so vast and so complex, is the seat of other automatic and unconscious reflexes.

One point concerns us immediately. If the simple, inborn reflex (a medullary reflex, for example) is explained simply, as inevitably as the functioning of an explosion motor since it results from the very arrangement of living matter, the conditioned reflex is not at all predetermined, which leads us to admit that the repetition of a signal must leave a trace in the nervous matter. This requires us to admit that the repetition of an excitation is followed by something like a molecular disturbance (of the cytoplasm or of the membrane); this would indicate that the same excitation renewed finds a path traced before it, and less energy is then necessary to obtain a functional response when the depolarization wave passes by routes prepared to receive it. This trace would be perhaps only an energetic trace self-entertained.

Now, if the material or energetic trace of an excitation permits the creation of a conditioned reflex, that is to say, to enrich our determinate heritage, everything is reflexive, and it is neither the richness nor the complexity of the mechanism that makes man a conscious being.

In order to explain the acquiring of consciousness, we believe it is necessary to admit that the more matter becomes complex in the brain of mammals, the more it becomes the seat of reflexive and unconscious arcs, certainly; but at the same time, it remains more capable of conserving the associative routes and free, indeterminate neurons, without reflexive traces and capable of responding in an unconditioned, "chance," or disordered manner in varied situations. What would enter into an innate or conditioned reflexive arc in an organism of the least nervous complexity might, in man, leave to the superior autoregulation a greater field of liberty to exercise itself without any conditioning. The acquiring of consciousness would result therefore from the impossibility for man, in his contact with the exterior world, to saturate himself with memorable traces, that is to say, with reflexes and unconsciousness, and the considerable accumulation of neurons and of associated involvements of its greater intelligence.

In this formula, the "I" is permanent and reflexive, a conditioned and material trace of past experiences. And the consciousness of this "I" would reside in the virginity of multiple nervous formations capable of responding by an act not formerly conditioned, whereas the analogy of the excitant process with others already tested might put into action a reflex, known then as such.

This unconscious "I," reflexive and conditioned, must have been enriched during the ages, since each man is born in his own age profiting from the acquisitions of all the men who have preceded him. And in regard to what we call "culture," is it not possible for the associative routes that are still void of traces to control and to autoregulate a conditioned substratum, which is richer in all the past experiences of the individual and of the species?

The more numerous the reflexive traces in a sufficiently complex brain, the greater are freedom and choice. The child who learns to read understands only secondarily the meaning of what he reads; all his effort is concentrated on assembling the letters and sounds.

Man is never more conscious than when he finds himself in a new situation to solve. This "lucidity" has nothing metaphysical about it. It is the consequence of all the organic reactions to the new excitation. Does not the suprarenal gland then secrete adrenalin, which increases the nervous excitability depolarizing the cells and this lowering of the threshold of excitability, of the reflexive routes, but also of the new routes likely to respond by chance to the new experience? Does it not lead the entire nervous system to autoregulate itself more quickly and more exactly?

Here then is the real problem. Since the individual is a materially integral part of a medium, how can we conceive that this medium exists and therefore that the individual exists also, which is false since the two together make only one?

Let us summarize: Chance and indetermination have complexified matter. Complexified matter has left less room for chance and more room for order. Thus, departing from chance, we find ourselves confronted by a more and more narrow

determinism. This determinism, which increases on the animal scale in proportion to the growth of the number and the associations of determinate neurons, which expand in the conditioned reflex, grows parallel, with the increasing complexification of the brain, to a new indeterminism of the second degree, for there then remain more free routes for unconditioned responses.

Man, supporting the weight of his reflexive determinism, would not be a conscious being if he were entirely conditioned. He would be likewise unconscious if his brain contained only virgin formations, without traces, for his reaction to the medium would then be uniquely due to chance and would respond to statistical calculation. He would not have an idea of time nor of the "I," and the greatest disorder would rule in the considerable associative richness made possible by the billions of shuntings employable by his large brain.

Since his reflexive determinism is unconscious, it is his indeterminism that first impresses him and that has made man believe he is wholly free.

We have therefore come to the conclusion that at the level of complexification of the human brain, consciousness is born of autoregulation of the tendency to determinism of the reflexive conditioning, which is indispensable to the idea of "I" and of time.

This autoregulation can be considered on the model of cellular autoregulation, since the more the conditioning increases, the more it is submitted to the physical determinism of the molecular scale, the more in return its exchanges diminish, and the more it becomes capable of responding in an original fashion to a new situation. (For example, each time the pianist acquires a new reflexive mechanism, he can do so only after having become conscious of the difficulty to be solved, but the acquisition of the reflexive mechanism leaves his consciousness free for a new difficulty to conquer.)

Therefore, animals of all species (the matter of whose brain, insufficiently complex on the organic scale, is rapidly filled by reflexive traces) do not attain reflective consciousness and become determinate in a more or less narrow conditioning. Young anthropoid monkeys have a psychic development as rapid as that of the human child during the first years of life. Then this development stops, whereas that of the child continues, for his more complex brain can maintain the equilibrium between determinate and indeterminate nervous matter, between determinism and chance.

It seems thus that at each stage of complexification one must reach a certain level for a new property to emerge. At the stage of the molecule we had to reach the nucleoprotein. At the stage of the pluricellular organism, it was necessary to reach the structural complexity of the human brain for the reflective consciousness to emerge. And what is apparent in all cases is not an inherent property of nature, but a function linked to the direction of energy in a new dynamic equilibrium.

As at the level of the molecule, then of the cell, the complex organism is limited in its complexification, for it must maintain contact with the indeterminate, since complexification is possible only through the exchanges between what is submitted to determinism and what is submitted to chance. On the animal scale the maintenance of this contact, indispensable to the growth in complexification of reflexive conditioning, could be accomplished only by the appearance of the larger human

brain, a new stage in individualization that permitted wide exchanges between determinism and chance, between complex matter and matter that is less complex.

DEFINITION OF AGGRESSION AND THE REACTION OF THE LIVING BEING

The Isolated Cell. Aggression for the cell is constituted by any variation in the extracellular medium exceeding the limits in which autoregulation is able to maintain intact the protoplasmic complexification. Since autoregulation maintains the balance between the tendency to equalization, disorder, and chance and the tendency to complexification, order, and determinism, the predominance of one tendency over the other will be the first consequence of the aggressive action. It is, in general, a tendency to equalization. The cellular response consists of a metabolic increase, which sometimes permits the cell to escape and to repolarize or, in other words, to maintain its complexification. There may be a temporary or definitive cellular lesion, i.e., a local decomplexification, and if the tendency to equalization persists or is generalized without being compensated, the cell dies.

The Pluricellular Organism. The functioning of the systems of intercellular correlation maintains equilibrium at the cellular stage by preserving the constancy of the characteristics of the interior medium and that of the complexified protoplasmic medium of the cell.

When a muscle works, for example, its accumulated provision of oxygen is assured by complex mechanisms that are themselves autoregulated. It is thus that the metabolic growth liberating more hydrogen ions and the lowering of the *p*H of the interior medium depolarize, therefore excite, the respiratory and cardiac centers, provoking an acceleration in the cardiovascular functioning necessary for a more active mobilization of the hydrogen ions of the cells toward the lungs, and provoking likewise the acceleration of the ventilatory function necessary to a better supply of oxygen, acceptor of hydrogen ions of the muscle, and to a better evacuation of the hydrogen ions at the level of the lung in the form of carbon dioxide and water. Thus the organism maintains its equilibrium. This equilibrium is maintained on the one hand between the cell and the interior medium and on the other hand between the individual and the exterior medium, since it is this exterior medium that was the cause of the increase in work. This is a nonaggressive physiological phenomenon.

Organic aggression, on the contrary, is characterized by a lesional syndrome (consequence of the aggressive action on a determinate cellular grouping) strictly identical to the one we have described for the isolated element. But since the cell now belongs to a complexified organism, which is itself autoregulated, besides the loss of local cellular autoregulation at the aggressed point, we will observe a disturbance of the physiological autoregulations that we have just considered.

An evolved organism like the cell attempts to re-establish its autoregulation in the face of the threat of aggressive equalization by raising its metabolism and protecting its complexification, which is represented principally by the nervous centers. In the more evolved beings, there appears a response of a new type, the result of

which is not the maintenance of the broken physiological equilibrium, but the protection of the cerebral centers indispensable to the recognition of danger and to the command of organs necessary for escape or to fight (heart, lungs, muscles). These organs, like the brain, will be preserved by a preferential circulation not participating in vasoconstriction and by the anoxia from which the splanchnic organs suffer. Therefore, in the evolved being, in addition to a local lesional syndrome, there is a general reactional syndrome replacing the physiological autoregulation. This reaction ends in the protection of autocinesis, an essential means of defense in many animal species, and in the protection of the reflective consciousness in man, permitting an original attitude in a particular situation. It protects the individual in relation to the exterior medium, and that at the expense of certain cellular groupings in relation to the interior medium.

Thus the organic reaction to aggression is strictly determinate, brought about by innate endocrine-vegetative reflexes, which sometimes complete certain conditioned reflexes. But this reaction, protecting the centers, the summit of organic complexification, protects the reflective consciousness in man and hence permits an action that may be neither entirely determinate nor entirely by chance, in other words, a conscious, human action. This reaction permits the preservation in man of the third echelon of liberty, which exceeds the possibilities of escape or conflict.

DEFINITION OF AGGRESSION AND OF THE PSYCHIC REACTION

Just as a fracture of the foot leads to immediate functional disturbances and sequelae, cerebral trauma, infections, exogenous and endogenous intoxications, metabolic disturbances, hereditary lesions may create nervous lesions followed by functional nervous disturbances. These lesions may disturb the cerebral autoregulation between reflexive responses and indeterminate responses and thus provoke disturbances in the consciousness and behavior.

However, it is possible that psychic aggression may not be conditioned by a direct cerebral lesion. In addition to the disturbance of cellular autoregulation and that of organic autoregulation, which may be studied in the anesthetized animal, the acquiring of consciousness might involve in man a third type of reaction. This would concern the maintenance of cerebral autoregulation between the reflexive routes and indeterminate routes that we have admitted.

Let us take fear as an example. In the animal, the discharge of adrenalin and the lowering of the threshold of excitability of the central routes do not appear to be able to cause stable psychic disturbances since we have admitted that the nervous routes are, in the majority, reflexive and determinate. The disturbance can exist only in the cell and not in the consciousness. The consequence will be either a healthy organic reaction that will favor escape or conflict or an inhibition of the reflexive routes if global depolarization takes place. If the aggression is repeated, it will do nothing but cause a new conditioning to be developed.

In man in identical circumstances one can imagine that depolarization will take place on the reflexive routes as well as on the unconditioned routes. At a certain intensity, variable with the former nervous excitability of the individual, there will

result from this either total inhibition or a functional anarchy similar in some ways to that of fibrillation for the heart. One can admit that this reaction, which tends to equalization, may even erase certain conditioned traces, signs of complexification and of determinism. Whereas the reconstruction of the reflexive material might be accomplished harmoniously in the animal, it risks becoming uncontrolled in man, where a greater measure of indeterminism is apparent.

But one can likewise imagine that the unharmonious organic reaction may also permit, in case of former disturbances of autoregulation, an autoregulated reconstruction between the reflexive capital and indeterminate shuntings. This analogy might be followed with the heart, on the level of near complexity, since an electric shock can provoke fibrillation or, on the contrary, cause it to cease if it exists. Is this not an interpretation of the therapeutics of shock?

In such a mechanism psychoanalysis too finds an explanation, the acquiring of consciousness of a conditioned and therefore unconscious phenomenon, ending by causing it to pass into the domain of autoregulation, that is to say, by placing it in balance with indeterminate shuntings, from which there is a greater possibility of escape and freedom.

ATTEMPT AT TEMPORARY CONSTRUCTION OF A BIOLOGICAL FRAMEWORK OF THE PSYCHIATRIC SYNDROMES

In a recent study on neuromuscular excitability, we showed that the autoregulated functioning of the cell may be inhibited (and the functional efficacy prevented) in two opposite situations: the first in the case of stable depolarization of the cell (which we qualify as exhaustion) in the course of which the processes of repolarization (therefore metabolic in complexification) are powerless to struggle against the tendency to thermodynamic equalization; the second in the case of surpolarization, generally secondary to an original depolarization that becomes overcompensated.

It appears finally that the physicochemical structure of the membrane must also be considered. The increase in its permeability, due to a lack of calcium for example, may cause to appear an oscillant functioning of depolarization-repolarization, which ceases very slowly.

The postaggressive oscillant reaction found on all levels of complexification evidently remains physiological if it continues to be harmonious and assures a rapid return to the equilibrium.

The unharmonious reaction is most often a tendency to equalization, to the unconditioned. The liberation of adrenalin, which accompanies it on the organic scale, depolarizes and increases the excitability. In the consciousness it favors unconditioned acts such as one observes in anger or in other strong emotions. But the loss of autoregulation may be imagined in an inverse manner if on the cellular level it is the consequence of an overpolarization (enriching of the cell in potassium), of a tendency to determinism. That is what happens, we believe, in delirium tremens, which liberates certain conditioned or innate reflexes from the control of the unconditioned, while disturbing even the correct functioning of these reflexes. In

both cases the level of consciousness is evidently lowered, since the balance between determinism and indeterminism is broken. But in the first case, adrenalin and corticoid hormones participate so much as determinant factors of the psychic disorder that they may even produce such disorders if they are administered unwisely. In the second case, on the contrary, they possess a curative effect, which we have often mentioned.

In addition to these acute cases, certain chronic syndromes find their place in this construction. Everything that implies a loss of the "I" implies also a disturbance of the conditioning of the determinate, of the "trace." These disturbances in the conditioned reflexive capital may be more or less stable, linked or not to a lesion in the nervous organism. They may also be "functional," which does not mean denuded of material support. If we admit that the "trace" is a conditioned molecular arrangement of certain nerve cells, one can imagine that this molecular arrangement may be disturbed, either by an organic lesion (physicochemical) or by a temporary displacement of toxic, pharmacological, or functional nature. In this last case, the most interesting, it results from a different or contrary conditioned molecular arrangement, a consequence of new excitations, which disturb all or a part of the slowly established molecular edifice.

In any case, there will always be a disturbance of the determinate, complexified capital of the brain. In this case indeterminism predominates, and we have here an interpretation of the schizophrenic syndrome, which appears coherent to us, whereby indeterminism utilizes the fragments of the upset determinism in order to assure its relationships with the exterior world.

In the case of catatonia, there is no doubt a still deeper disturbance, which means that all excitation of the environment unleashes, uniquely on its innate reflexes, postural reflexes, a wave that is not at all weakened or is weakened with difficulty. In order for this to be possible, it is necessary that not only the scale of complexification of the consciousness, but that of the conditioned reflex as well, lose any later relationship with the most archaic reflexive routes. This may be interpreted as the equivalent of an auriculoventricular dissociation for example, provoked by quinidine intoxication, whose resultant surpolarization on the cardiac fibers disturbs spreading of the sinusal rhythm. The automatism of certain gestures that one can sometimes provoke in certain cases would come from the excitation, therefore from the limited depolarization, of synergistic tissular groups, whose weakening causes pain. It is curious to observe that such syndromes may be provoked by chlorpromazine in some dosages. This drug destroys the conditioned reflexes and possesses a polarizing action. It is, moreover, adrenolytic.

One is led in this case to consider depressive and melancholic syndromes as the expression of a predominance of the conditioned reflexes and determinism over chance and unconditioning. Now, chlorpromazine has little or no therapeutic action in these cases. But let us repeat that similar functional disturbances may appear, it seems, in opposite neurophysiological conditions: depolarization and surpolarization. A drug like chlorpromazine, whose therapeutic action appears to us to be linked in part to the polarization that it provokes on certain cellular structures, will be effective only in case of depolarization, in syndromes of agitation in general,

where indeterminism predominates, and will be ineffective in cases of already exaggerated polarization. Coirault, on this basis, has demonstrated similar facts in persons with anxiety and insomnia: Repolarization by glucose insulin (repolarizing combination) sometimes cures and in other cases aggravates, the latter then being paradoxically improved by amphetamine, a depolarizing agent. In the same way, the increase in neuromuscular excitability accompanies all acceleration of the metabolic processes, whether this is the result of depolarization or the consequence of repolarization.

PSYCHIC EQUIVALENTS OF THE METABOLISM AND CELLULAR EXCHANGES

We know that cellular autonomy and the maintenance of its complexification are obtained only because the metabolism retains different ionic concentrations from each side of the membrane. The incessant exchanges between the extra- and intracellular medium will be regulated by the membrane potential, itself regulated by the metabolic intensity. The membrane potential in return will regulate the metabolic intensity by regulating the intensity of the exchanges.

On the level of the animal organism a similar autoregulated functioning is seen. The more the animal has contact with the environment, the more its exchanges increase, the more it enriches its conditioned nervous mechanisms, and the more it protects its differentiation, but at the same time it becomes more determinate and its insufficiently complex brain becomes less capable of registering new experiences. There is in the nervous functioning a tendency toward a limit (similar to that met on the cellular plan) between exchanges and psychic metabolism if we consider the latter a factor of complexification.

It is only at the level of the greatest human intelligence that the equilibrium preserved between determinate and indeterminate routes permits the individual, on a plan of superior complexification, a veritable escape, which makes possible a greater complexification. This equilibrium, which characterizes the consciousness, between conditioned and unconditioned then governs the exchanges between the individual and the environment. It is the consciousness that, as a membrane potential preserving its average value, permits a growth in determinism and conditioning, regularly compensated by the indeterminism of the relatively unconditioned response in the presence of new situations.

Any fall in the level of consciousness will correspond to a disturbance in autoregulation at its level of complexification. If the determinism of the conditioned reflexes predominates, which corresponds to surpolarization or "speculation," the exchanges diminish and the result is a limitation in enrichment of the "I." The exterior world no longer leaves new traces, and the individual, who no longer projects himself freely on the world, can no longer increase his complexification. This is what happens in the animal. For it to increase its determinism, it must, in a parallel manner, increase its indeterminism, in order to increase the possibilities of equilibrium between the two, that is to say, to raise its degree of consciousness and its exchanges. We find here indications for the therapy of shock: depolarizing agents

that provoke a tendency to equalization, thus increasing the exchanges and perhaps leading to a cure.

On the other hand, if indeterminism and the tendency to equalization are predominant, the exchanges no longer take place, the traces are erased, and the individual responds in an incoherent manner to the contacts of the exterior world. Ataractic, neuroleptic, and repolarizing therapies find their indications here. In these cases the ideas of time and of the "I" weaken, in the first instance because the individual is more or less entirely conditioned, in the second because he is more or less entirely indeterminate.

These ideas of exchanges and of psychic metabolism have, it seems to us, a social resonance that would necessitate long development, as much for the individual in society as for the behavior of human groups themselves, on all scales of complexification. It is not possible to consider them here. We think, however, that in the limited problem of the individual, this trial may furnish a framework for the interpretation of certain abnormal, seminormal, and even normal behaviors.

In any case, there arises from these hypotheses a general framework in which one might systematize roughly the psychic phenomena. First, the dominating principle, the equilibrium between the conditioned and unconditioned processes, is necessary both to the acquiring of consciousness and to the maintenance of exchanges, and it is therefore necessary to make possible the increasing psychic complexification of the individual and of the species in a dynamic and harmonious form.

The second principle, a psychic oscillant reaction, results from the development of contact of the individual with the exterior world. There is an oscillant reaction between determinism and indeterminism, these words having not only an abstract meaning, but a material basis on the scale of the nervous substance. The inhibition, for example, of the conditioned routes allows us to conceive of a possibility of a greater functioning of the unconditioned routes, hence a greater indeterminism. We are here at the level of the complex organism. It is therefore an expression of a global functional disturbance. But the term "inhibition" is not a strictly functional word. This inhibition on the cellular plan implies a state either of stable depolarization or of surpolarization. These states may come, as we have seen, on the cellular scale as the consequence of an organic reaction to aggression. They are linked to material, precise biological phenomena.

This reaction is a dynamic, living phenomenon, and is thus oscillant, as long as it is functional and not lesional, as we have stated. There is therefore the risk of passing successively from one condition to the other, through the simple fact of the existence of the nervous reaction. The extreme complexification of the nervous organization makes these conditions, at the present stage of the hypothesis, difficult to explore more thoroughly. We do think, however, that audacity is permitted in an attempt to find a basis on some precise, general, and unregisterable biological phenomena (which we know today are entirely linked to matter) for the normal and abnormal psychic phenomena, whose only reality at present seems most often to reside in the words that man has chosen to designate, classify, and interpret them. This study must call on the most varied branches of science: nuclear and molecular physics, chemistry, biochemistry, bioelectrogenesis, general physiology and neuro-

physiology, pharmacology, psychology, psychiatry. Such a study obviously multiplies the chances of grave errors. It is the role of each of us to submit them to his own means of control.

CONCLUSIONS

No doubt some persons will find this report void of probability. Others will perhaps find in it a lack of originality, very possible because of the insufficiency, which we confess humbly, of our psychiatric knowledge.

On the other hand, we must say that, hoping to retain in this article a maximum of clarity, which we are not sure we have done, we have systematized in the extreme. Because of this, many secondary arguments, which are not however negligible, have not been kept. In the same way certain developments in the domain of psychology, sociology, or pure philosophy have not been touched. Such an approach may perhaps form a basis for future study in these varied fields.

Last, we decided to prepare this work, to which we have been led temporarily by our research in various fields for several years, in order to submit it to liberal criticism, which in this case may be constructive. The development of psychopharmacology appears to us capable of tolerating any effort made in the search of biological bases to psychic phenomena.

SYMPOSIUM ON MEDICINE AND WRITING

The Symposium on Medicine and Writing that appeared in the November 1956 issue of INTERNATIONAL RECORD OF MEDICINE has been published as a Monograph. The articles included in this Monograph are: "The Editing of a Modern Medical Textbook" by Russell L. Cecil; "Plain Talk and Clear Writing" by Morris Fishbein; "The Principles of Bibliographic Citation" by John F. Fulton; "The Art of Communication" by Joseph Garland; "On Writing a History of Medicine" by Douglas Guthrie; and "Minerva and Aesculapius: The Physician as Writer" by Félix Martí-Ibáñez

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Evaluation of a New Oral Antipruritic

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The treatment of most dermatological disorders requires a twofold approach: specific therapy directed to the cause of the disorder, and antipruritic therapy to relieve the distress of itching and to eliminate scratching that may produce secondary infections, aggravate skin lesions, and interfere with specific therapy. This latter phase of therapy is of primary importance since, if accomplished rapidly, it establishes excellent rapport with the patient and eliminates the more common complications that can develop later.

Orally administered antipruritics currently in use include, chiefly, sedatives, antihistamines, ataraxics, and steroids; topically applied antipruritics are legion. Unfortunately, most of these medications, whether administered orally or topically, have their limitations.

Recently, a new phenothiazine derivative, trimeprazine (Temaril*), which can be administered orally in tablet form, has reportedly demonstrated a marked antipruritic effect in various dermatoses and systemic diseases.[1, 2] An evaluation was undertaken to determine whether trimeprazine would control itching in a series of patients, particularly those suffering from pruritus ani.

MATERIAL AND METHOD

Forty-seven patients, 35 of them suffering from pruritus ani, were selected for this evaluation. Of the remaining 12 patients, 7 had neurodermatitis and 5 had other common dermatological disorders. In all cases, pruritus was severe and was the most significant and complicating factor. Previous antipruritic therapies for 10 patients, including topical steroids administered for periods varying from one to six months, had not produced satisfactory control of pruritus; the remaining 37 patients were being treated for the first time. Since 7 of the patients with pruritus ani required anorectal surgery, trimeprazine was administered to relieve itching associated with the disease and to relieve postoperative itching. Initially, all the patients received 2.5 mg. (1 tablet) of trimeprazine three times daily. Dosages were then adjusted in accordance with patient response. Twenty-two patients were given, in addition to trimeprazine, a topical steroid (20 patients), a topical antihistamine (1 patient), or an ataraxic (1 patient). The remaining 25 patients received no concomitant therapy. It was possible, therefore, to compare the antipruritic results obtained with trimeprazine with those obtained with trimeprazine and a concomitant antipruritic. Because certain phenothiazine drugs have been reported occasionally to produce jaundice and blood changes, urinalyses and complete blood counts were done on all patients during therapy. The duration of therapy ranged from three days to two months.

* The trade name of Smith, Kline & French Laboratories for trimeprazine is Temaril.

At the conclusion of each patient's therapy, the effectiveness of the trimeprazine was evaluated according to the following criteria: excellent—prompt (within a day or two), complete and lasting relief of itching; good—substantial relief of itching for the greater part of the duration of therapy; poor—only occasional or no relief of itching.

RESULTS

Of the 25 patients receiving trimeprazine alone, 14 patients (56 per cent) had excellent results; 9 patients (36 per cent) had good results; 2 patients (8 per cent) were not significantly benefited. Of the 22 patients receiving trimeprazine and concomitant antipruritic therapy, 11 patients (50 per cent) had excellent results; 10 patients (45 per cent) had good results; 1 patient (5 per cent) was not significantly benefited. Thus, for all the patients in the evaluation, 25 (53 per cent) had excellent results; 19 (40 per cent) had good results; 3 (7 per cent) had poor results.

Of the 35 patients with pruritus ani, 19 (54 per cent) had excellent results; 15 (43 per cent) had good results; 1 (3 per cent) had poor results. Seventeen of these patients received trimeprazine and concomitant therapy; for these, the excellent and good percentages (there were no poor responses) were 53 and 47 per cent, respectively, while the percentages of excellent, good, and poor results for the patients with pruritus ani who received only trimeprazine were 55, 40, and 5 per cent, respectively. All 10 patients who had obtained unsatisfactory results with previous antipruritic therapies were improved on trimeprazine. Eleven patients who complained of being awakened at night by intense itching were able to sleep through the night when they were given an additional 2.5 mg. of trimeprazine at bedtime.

Twenty patients reported mild drowsiness as a side effect, but in almost all patients this effect was of brief duration, persisting at the most for three days. In 6 patients the dosage of trimeprazine was reduced to eliminate drowsiness. No other side effects were reported. Laboratory tests failed to show any abnormal changes in hematology or liver function.

DISCUSSION

In the opinion of the writer, the most significant result obtained in this evaluation concerned the degree of antipruritic results obtained when trimeprazine was used alone and when it was used concomitantly with topical or systemic antipruritics. The 25 patients who received only trimeprazine achieved relief equal to that achieved by the patients receiving both trimeprazine and oral or topical medications. This was as true for the patients with pruritus ani, a condition that affords a particularly severe test for an antipruritic, as it was for the entire series of patients. The only conclusion that this permits is, of course, that the decisive antipruritic agent in all patients was trimeprazine. This conclusion is further strengthened by the improvement shown by the 10 patients who had not responded satisfactorily to prior antipruritic therapy.

Whether trimeprazine will actually control itching due to any cause is, of course, answerable only by further trials. On the basis of the patient sampling in this

evaluation, however, trimeprazine has shown itself capable of eliminating or substantially reducing itching associated with infection, contact dermatoses, and surgery.

SUMMARY

Forty-seven patients, 35 of them suffering from pruritus ani, were treated with trimeprazine, an oral antipruritic. Twenty-two of these patients were also treated with topical or oral antipruritics.

Twenty-five patients (53 per cent) had prompt, complete, and lasting relief of itching; 19 patients (40 per cent) had substantial relief; 3 patients (7 per cent) were not significantly benefited. Results for the 25 patients receiving trimeprazine and for the 22 patients receiving trimeprazine and an additional oral or topical antipruritic were essentially equivalent, being within a few percentage points of each other. Mild drowsiness, of brief duration, was the only side effect reported. An additional dosage of trimeprazine at bedtime eliminated sleeplessness caused by intense itching in 11 patients. It is concluded that trimeprazine is effective in eliminating or substantially reducing itching associated with pruritus ani and other dermatological diseases.

ACKNOWLEDGMENT

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Heart Disease and Pregnancy

Expectant mothers with rheumatic heart disease or congenital heart lesions in most instances may bear children with safety, according to a study conducted by Drs. C. S. Burwell and James Metcalfe of the Boston Lying In Hospital (*J. Tennessee M. A. 51*:204, 1958).

The investigators reported on the course of 355 pregnancies in 277 patients. Most of the patients had rheumatic heart disease (85 per cent), while 35 (12 per cent) had congenital heart lesions. "Most patients did well, there being a 98 per cent survival rate. The necessity of interrupting the pregnancy is less and less often encountered. In 1950, 18 per cent and in 1956 only 1 per cent of the patients had to have the pregnancy disturbed," the obstetricians said.

Efficiency of Barbiturate-Nitrite Ion Action in Angina Pectoris

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Following an industrial upsurge after the Civil War, an awakening chemical industry introduced amyl nitrite into medicine for the treatment of angina pectoris.[1] Explanation of the activity of the nitrite ion in controlling anginal pain was based on its most evident actions, peripheral vasodilation and fall in blood pressure.[2] This explanation has persisted to modern times in different guises, namely the measurement of peripheral vasodilation as evidence of nitrite ion activity.[3] However, the introduction of the more slowly acting nitrite ion sources, such as pentaerythritol tetranitrate and mannitol tetranitrate, has shown that the manifest peripheral vasodilation and sharp fall in blood pressure are not necessary concomitants of relief from anginal pain.[2] Pulse tracings, taken after amyl nitrite,[4] exhibit rapid bounding pulse, which is usually accompanied by a feeling of fullness in the head. Again, the introduction of slower-acting pentaerythritol tetranitrate has demonstrated that these side effects are not necessarily found during treatment with these newer nitrite ion sources.[5]

Recent introduction of a timed-disintegration form of medication with pentaerythritol tetranitrate has almost completely eliminated these side effects.[5]

After a brief and stormy history, during which time it was shown that enteric-coated tablets either dissolved in the stomach or did not allow disintegration at all,[6] the timed-disintegration capsule was introduced and was accepted by *New and Nonofficial Remedies*.[7] The principle was established that roentgenographic studies made possible the exact timing of the timed-disintegration capsules.[6, 8] Thus, a single capsule can now be relied on to give from 8 to 12 hours of medication in place of divided doses in the usual tablet form.[7] The course of disintegration of such timed-disintegration capsules of pentaerythritol tetranitrate was described adequately by roentgenographic technique[8] and by a study of nitrite ion blood levels.[5] It was shown that, due to the slow disintegration of pentaerythritol tetranitrate, these timed-release pellets could maintain a constant blood level of nitrite ion for a period of 12 hours, after which the dose could be repeated.[5]

The consensus of the modern view is that the anginal syndrome is due to anoxemia of the cardiac muscle[2] and that treatment should be directed not only to increasing the blood supply to the cardiac musculature, but also to mild continuous sedation.[9] It is obvious that since the anginal syndrome depends on the ratio of cardiac demand to oxygen supply to the cardiac musculature, there are two main approaches—increase of blood supply and decrease in oxygen demand. Both these objectives are obtained by the timed-disintegration form of pentaerythritol tetranitrate plus a short-acting barbiturate such as secobarbital. This combination* (Corovas Tym-

* The trade name of Amfre-Grant, Inc., for a combination of pentaerythritol tetranitrate and secobarbital in timed-disintegration form is Corovas Tymcaps. No sodium is included in the contents of the capsules.

caps) has been tested in a series of patients with severe anginal syndrome with outstanding success. This conclusion is based on a comparison of treatment of the anginal syndrome with barbiturate alone, pentaerythritol tetranitrate alone, and a combination of the two in timed-disintegration form.

The preparations used were plain pentaerythritol tetranitrate (60 mg./24 hour period), plain secobarbital (100 mg./24 hour period), and a combination of the two in timed-disintegration form (given in 2 capsules, taken 12 hours apart, a total of 60 mg. of pentaerythritol tetranitrate and 100 mg. secobarbital).

Case material consisted of a group of patients having severe anginal pain due to coronary insufficiency. All patients were ambulatory, but had limited ability to do physical work. The average age of patients was 55.6 years and there were more men than women.

The group, on which 90 case studies were made exactly comparing the medications noted, was part of a larger group of more than 100 cases showing, on an informal basis, very similar results.

A careful history, physical examination, electrocardiogram, and cardiac teleroentgenogram were taken in every case. Although the formal exercise test usually has applications that are largely medicolegal,[10] a comparative form of exercise test, though less formal, was found to be entirely satisfactory in rating the severity of the syndrome and the effect of medication. Descriptions of stair-climbing activity and the amount of walking possible, together with the physician's estimate of the disposition of the patient, formed a basis for comparison. Each patient was tested before and after receiving each of the medications in order to determine the value of the medication utilized.

Results of these tests indicate that, from the standpoint of stair climbing, walking, and general impression, patients taking secobarbital alone were not substantially improved except in about 25 per cent of the cases; those taking pentaerythritol tetranitrate alone were substantially improved in approximately 40 per cent of the cases; while those taking a combination of the two in timed-disintegration form were substantially improved in approximately 80 per cent of the cases.

Pain in the anginal syndrome is the end result of too great an oxygen demand by the heart muscle. This is brought about by the exercise or diminution of the usual oxygen supply. Thus, there are two occasions when pain is prominent—first, when bodily exercise has increased the circulatory demand for a sufficiently long time to require unusual oxygen demand by the cardiac musculature, thus causing anoxemia, and, second, when the general circulatory flow has decreased the blood supply to the cardiac muscle below the basal resting level of oxygenation, which usually happens during sleep. Generally speaking, the degree of pain follows the exercise test levels almost exactly. Thus, when the exercise tolerance has increased, pain is reduced and the attacks are less frequent. The limitation, from the patient's standpoint, is that of pain limiting his exercise. Therefore, the exercise test presents one of the most objective means of estimating pain.

SUMMARY

Historically, nitrite ion therapy[2] has been most efficient for the relief of anginal

pain. When it is used in combination with the barbiturates, still greater benefit can be anticipated.[9] One of the early ideas in reference to the rationale of nitrite ion therapy was that the vasodilation and fallen blood pressure are responsible for the relief of anginal pain.[2] This idea has persisted in regard to measurement of effect of nitrite ion.[3] The modern rationale indicates that anginal pain is caused by anoxemia of the cardiac muscle, that relief is afforded only by dilation of the vessels supplying the cardiac muscle,[2] and that further relief can be afforded by lowering the oxygen demand of the whole system by the use of sedatives.[9]

One of the greatest problems in combined sedative and vasodilator therapy has been the necessity of providing mild prolonged action for the full 24 hour day. Early attempts to provide this type of medication have led to the selection of slow-acting pentaerythritol tetranitrate as the nitrite ion source of choice[11] and seco-barbital as the sedative.[12]

The efficiency of these two medications, requiring many divided doses, has been greatly increased by the use of a special capsule providing 12 hour timed release of the medicaments. This provides 12 hour medication of 30 mg. of pentaerythritol tetranitrate and 50 mg. of secobarbital in timed-disintegration form.[5] The capsules, taken before breakfast and before retiring, have provided 24 hour relief from anginal syndrome in a substantial number of severe cases.

CONCLUSIONS

A double-barreled attack is desirable and helpful in treating anginal syndrome due to coronary insufficiency. Treatment directed toward decreasing coronary muscle anoxemia extends the amount of exercise that the patient may sustain and at the same time cuts down substantially the degree of pain. In addition, if the general level of oxygen demand can be decreased by sedation, the patient finds further freedom from pain. When these medications are combined in convenient timed-disintegration form, the patient is most appreciative and the medicaments are supplied much more regularly than is otherwise possible. The capsules described have supplied this type of medication in most convenient form and dosage.

ACKNOWLEDGMENT

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URINARY PAPER ELECTROPHORESIS. Urinary paper electrophoresis to determine protein content of urine in nephropathies is of little aid in diagnosis or prognosis (Acta med. scandinav. 160:353, April 15, 1958). In a study of 49 patients with various renal diseases, pathological globulins were present in the urine of 4, while serum proteins were normal; in the 12 patients with myeloma, urinary globulins were characteristic, making the test of possible diagnostic value in this disease. In the usual renal disorders, the globulin fraction is higher in urine than in serum, probably because of glomerular lesions, although tubular protein reabsorption may play a role.

NIGHT FEEDING IN INFANCY. Birth weight apparently is the factor that determines how long an infant must be fed at night (Lancet 1:877, 1958). A study in Middlesex, where demand feeding is encouraged, showed that of 55 babies whose weight was less than 6.5 pounds at birth, only 9 per cent had never had a night feeding, compared with 52 per cent of the 63 who weighed more than 8 pounds at birth. These differences disappeared by the age of 3 months--91 per cent of the smaller babies and 89 per cent of the heavier babies had ceased the night feedings.

NEW ANTIBIOTIC REPORTED EFFECTIVE. A new antibiotic, triacetyloleandomycin (Tao, J. B. Roerig), found in the laboratory to be considerably better absorbed than its precursor, oleandomycin, was administered to 135 patients with a wide variety of infections (AM&CT 5:527, Aug., 1958). Results were excellent in 120 cases, good in 12, and poor in 3. Triacetyloleandomycin was very well tolerated; side effects were mild and limited to 7 instances. This drug appears to possess considerable clinical potentialities.

NEARSIGHTEDNESS. Children suffering from noncongenital nearsightedness have been helped by a special well-balanced diet containing an amount of animal protein food equal to 10 per cent of the total caloric intake, reported P. A. Gardiner (Guy's Hospital, London) recently in Lancet. A one-year study showed the following: The gradual deterioration of vision associated with nearsightedness was arrested in some children aged 12 and older; some of these children actually experienced some improvement in myopia; among those children less than 12 who received the special diet, the deteriora-

tion rate toward poorer vision was slower than in the control patients who did not receive the special diet.

ESSENTIAL HEMATURIA. Decapsulation gave satisfactory results in 8 cases of essential hematuria seen in the past 10 years by Professor Karel Uhlir (Ostrava, Czechoslovakia). One exception was a girl of 17 in whom conservative treatment was without effect. After decapsulation, the patient was in good health for 4 months; then there followed a new hematuria unresponsive to treatment. Severe anemia necessitated nephrectomy. Renal tissue was found to be choked by several cicatricial bands from the first operation. The patient has been in good health now for 10 years.

GROWTH STIMULATED IN PITUITARY DWARF. Quantities of human growth hormone were administered to a 17-year-old pituitary dwarf for more than 10 months in dosage of 2 mg. three times a week by M. S. Raben and C. H. Hollenberg (New England Center Hospital, Boston). They were able to stimulate growth at the rate of 2.6 inches/year in this patient and observed a return to normal of many metabolic processes. They also showed that the injections of the hormone produced a rise in the fasting values of plasma unesterified fatty acids and a fall in blood urea nitrogen, suggesting that changes in these levels might serve as a rapid test for the effectiveness of growth hormone preparations in man.

MALES HAVE HIGHER DEATH RATE THROUGHOUT LIFE. Males experience a higher death rate than females throughout life, with the disparity in mortality being smallest at the youngest and oldest ages and at its maximum during adolescence and early adult life, report Metropolitan Life Insurance Company statisticians. At the preschool ages, the death rate for boys is only slightly higher than that for girls, but the ratio of male to female mortality increases markedly with advance in age to a high of nearly 2 2/3 at ages 15-24. This widening disparity in mortality reflects largely the numbers of males involved in fatal accidents.

PORT-WINE BIRTHMARKS. Treating port-wine birthmarks with an electric needle brought "considerable improvement," reported Major Darl E. Vander Ploeg (Madigan Army Hospital, Tacoma, Wash.). While the improvement in appearance was not 100 per cent, the improvement in morale of the patients was "remarkable." In electrodesiccation the tissue is dehydrated by the use of a high-frequency current through a pointed needle electrode. A small test area is treated initially, and then there is a six-week wait to estimate the degree of improvement; other sections then are treated.

Heredity and Healing*

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The ancient study of family histories has an attraction for many people. Long ago, Saint Paul exhorted Timothy not to "give heed to fables and endless genealogies, which minister questions rather than godly edifying" (I Tim. 1:4). Nevertheless, fables and genealogies are worthy of study. Who has not, at some time or other, followed the ramifications of his own family tree, perhaps with the assistance of an octogenarian aunt or grandparent? This quest has a strange fascination. To have Jacobite ancestry, or a forebear who was killed at Waterloo, may be just as satisfying, on this side of the Atlantic, as it is, to be a direct descendant of a Mayflower Pilgrim, on the other side.

Some are led to investigate their pedigrees not merely out of curiosity, but for practical reasons. It may be that the possession of wealth or position, the succession to a title or an estate, or both, will depend entirely on an examination of ancestral records. Applied genealogy becomes, then, no mere amusement or intellectual exercise, although there are many who do actually revel in the tracing of ancestors, even of ancestors other than their own. Biography, always a popular branch of literature, has more devotees today than ever, and almost every biography, even that of an unimportant person, commences with a chapter entitled "Ancestry and Parentage," which is frequently the best chapter in the book.

The study of biography often provides strong proof in favor of the widespread belief that intellectual ability is an asset derived from ancestors. In no area of learning is heredity of more significance than in medicine, and the object of this paper is to give some examples of such heredity and to suggest ways and means of employing it to the best advantage.

But before mentioning the three medical families of the eighteenth century that form the subject of this study, it is essential to make a few general observations and to define certain terms.

HEREDITARY GENIUS

Since the appearance in 1869 of Sir Francis Galton's famous work, *Hereditary Genius*, interest in the subject has grown, but little has been added to his investigations. Galton, the founder of what he termed eugenics, now known as genetics, knew his subject well. He was himself a cousin of Charles Darwin and, thus, a member of a family that enriched many areas of science. Galton tells us in his preface that he ought to have called the book *Hereditary Ability*, because the word "genius" implies, or ought to imply, an ability quite unusually high and of a very rare order. Certainly not more than one person in a million is a genius. Nowadays the term is applied loosely. We speak of a person being "almost a genius" or "having a genius" for this or that. True genius is much more than "an infinite capacity

* Address delivered to the Scottish Genealogy Society, Dec. 16, 1957.

for taking pains." The genius is the man for whom a nation mourns when he dies and who will rank in the future as a figure in history. A genius is born, not made. He will come to the top whatever his education, circumstances, or social position. Eminence, on the other hand, is a quality much less rare. An "eminent" person, according to Galton, is one who has achieved a position attained by 250 per million or by one person in 4000. It would be difficult to define more explicitly what is meant by genius and eminence. In the assessment of mental ability, one should, as a rule, exclude those whose claim to fame rests on notoriety, local reputation, or ability to acquire wealth. Statesmen and rulers are so largely subject to their environment that they form a class by themselves. Their eminence is no criterion of their natural gifts. Often they have been pushed into their high position and if, to this fortuitous opportunity, there is added unusual mental ability, they may rise to a fame of the highest order.

But it is a profound error to suppose that any child, born with an average or mediocre brain, can be educated to become eminent. "If it is not in you, it will not come out" is the old Scottish proverb, and it has proved true, time and again. All who are concerned in education do well to bear in mind that heredity contributes more than environment to a successful result. Ancestry counts, and the parent may be more important than the teacher.

History abounds with examples of hereditary ability, in literature the Brontës, in art the Teniers, in divinity the Erskines and the Wesleys, in music the Bachs. The last-mentioned family had eight generations of gifted musicians, and 120 of them attended a family reunion in 1750. In the field of medicine, one may often note the influence of heredity on mental ability.

In early times medical knowledge was passed on from father to son. The Hippocratic Oath suggests to the student of medicine that he should regard his teacher as "equal to his parents," and that he should pass on the learning "to his own sons and to the sons of his teacher." Frequently the teacher was also the father, and throughout the long history of medicine, the "art," as Hippocrates called it, has been a hereditary accomplishment. Physicians' sons do not always become physicians, but many of them do, even today, and we need not search very far to find examples of two or more generations of physicians, such as the Heberdens, the Bells, the Pagets, and scores of others.

Paracelsus (1470–1541), whose importance as an original thinker had so profound an influence on the progress of medicine, was the son of a physician. Andreas Vesalius (1514–1564), who revolutionized anatomy, was the son, grandson, and great-grandson of physicians. Some famous physicians have followed in the footsteps of relatives other than their parents. For example, Ambroise Paré (1510–1590) had a brother and a brother-in-law who were both barber-surgeons, as he tells us in his delightful autobiography. William Harvey (1578–1657), the only one of the seven sons of Thomas Harvey to become a physician, had no head for finance, and might have been a poor man but for his faithful brother Elias who managed the business affairs of the family. Again, Laënnec (1781–1826) drew all his early inspiration from his uncle, a physician at Nantes, before he went to Paris to earn fame by his discovery of auscultation. And, nearer our own time, Joseph Lister (1827–

1912) derived his interest in the microscope from his father, a prosperous London wine merchant who was awarded the Fellowship of the Royal Society for his improvements in microscopic technique.

Medical learning was a family affair in the Western Isles of Scotland, as is shown by the surviving Gaelic medical manuscripts of the fifteenth to seventeenth centuries, now preserved in the National Library of Scotland. These manuscripts were handed down from father to son for generations, in the medical families of the Macbeths or Beatons of Islay, Mull, and Skye, and of the McConachers of Lorn. The earliest manuscript is dated 1403 and the most recent was written by Angus McConacher in 1641.

One need not explore the past for further instances of the influence of parents and relatives on the embryo physician. Each of us could give examples of the heredity of medical practice within our own circle of friends.

A London physician I know comes of a family with an unbroken line of physicians in each generation since early in the eighteenth century and with seven physicians in the present (his own) generation. And although a medical practice is no longer a salable asset and a valuable bequest from father to son, it cannot be denied that there is still a tendency for physicians' children to follow the medical profession.

At this stage it may be profitable to recall the familiar story of the Gregory family, so often quoted as an illustration of hereditary ability.

THE ACADEMIC GREGORYS

This unusually gifted family produced 16 professors of various universities within five generations. There is reason to believe that the "brains" were brought into the family in the sixteenth century when Janet Anderson married Rev. John Gregory of Drumoak. Janet was the daughter of David Anderson, who was known in Aberdeen as "Davie do a'thing." Among other accomplishments, Davie designed the spire of St. Nicolas' Church, and he removed a dangerous submerged rock from Aberdeen Harbour by harnessing it to a raft of barrels and allowing the tide to do the rest. Janet's son James might be fitly termed a genius. He became professor of mathematics at St. Andrews in 1669 and then at Edinburgh in 1674. He invented the reflecting telescope, and has been regarded as a forerunner of Newton. James Gregory's brother David, whose family numbered 23 children, had three sons and two grandsons who became professors of mathematics, astronomy, and history at St. Andrews, Oxford, and Edinburgh. James had a son, also named James, who was professor of medicine from 1725–1732 at Aberdeen, where medicine was taught earlier than at any other university in Britain, a "mediciner" having been included among the original staff when the university was founded in 1494. His son, still another James, succeeded to this post, which on his death in 1755 passed to his younger brother John. John Gregory had a brilliant career, at first in Aberdeen, and then after he was elected to succeed Robert Whytt as professor of medicine at Edinburgh in 1766. John Gregory did much to raise the standard of medical conduct and to state those principles of medical ethics that still obtain in practice. He died in 1773 and was succeeded in the chair by the famous William Cullen, with whom he had been joint-professor for several years. After the death of Cullen in 1790, John's son,

James Gregory, was appointed, the fifth of his family to occupy a professorial chair at Edinburgh. A teacher of great ability, he was, until recently, remembered primarily because of the nauseous powder that bears his name.

James's son, William, became professor of chemistry, while his nephew, William Pulteney Alison, held three chairs, of medical jurisprudence, physiology, and practice of medicine, at Edinburgh, in succession.

Thus the Gregory dynasty carried on until the middle of the nineteenth century. The story of the Gregorys is often cited as an illustration of the hereditary transmission of intellectual ability.

In order to approach the problem more closely and to note the effect of education and environment and the relative importance of those two influences, let us now glance at two other medical families, the Hunters and the Monros, and in particular, John Hunter and Alexander Monro primus.

THE STRANGE STORY OF JOHN HUNTER

Although John Hunter made no great discovery, he changed the entire outlook in surgery, raising it from the status of a craft to that of a science. After his time, surgeons ceased to be mere artisans. Viewing "the whole circle of the sciences round Surgery," John Hunter set out to explore that field. His marvelous museum of comparative anatomy was a monument to his achievement until it was destroyed by a bomb at the Royal College of Surgeons in 1941. Yet his early life showed no promise of this great work. Born in 1728 at the farm of Long Calderwood near Glasgow, he appears to have been quite a dunce at school. When he was 10 years old his father died, and he remained the spoiled child of his mother. At the age of 17 he could neither read nor write, and so it seemed as though he must gain a living by the work of his hands rather than his brain. His sister Janet had married a cabinet-maker named Buchanan, and to him John was apprenticed for a time.

A few years ago, in a paper on "Developmental Aphasia,"* Dr. Arthur Sinclair pointed out that John Hunter's disability in early life was of this nature. He was intelligent and eager to learn, but he was unable to connect facts and ideas with pointed symbols. Ability to read and write was retarded, although no mental defect existed.

In 1748, when he was 20, John Hunter reached a turning point in this unpromising career. His brother William, 10 years his senior, after a short partnership in medical practice at Hamilton with Dr. William Cullen, had gone to London where he was already making a name for himself by teaching anatomy and practicing obstetrics, a strange combination, but not an uncommon one in the eighteenth century. William Hunter invited John to join him in London, and it soon became obvious that the young and stupid boy was in reality the more brilliant of the two brothers. He excelled in the study of nature, although he had no taste for scholarship. What he did possess, in full measure, was the gift of curiosity, so strongly developed in many children but so sadly lacking in adult life, when "the vision splendid" has tended to "fade into the light of common day." John Hunter wrote later: "I wanted to

* *British Journal of Ophthalmology*, Sept., 1948.

know all about the clouds and the grasses, . . . I watched the birds, bees and tadpoles, and I pestered people with questions about what nobody knew or cared anything." John Hunter owed nothing to education from without; his talent was inborn, and he refused to allow any external influence to kill his originality. His was not the scholastic type of mind. "Why think, why not try the experiment?" he wrote to his famous pupil Edward Jenner, at Berkeley, Gloucestershire, not regarding vaccination, which was introduced by that country practitioner after Hunter's death, but in a letter concerning some experiments that he and Jenner were conducting on the hibernation of hedgehogs. Just as John had been introduced to his lifework by his brother William, so did John, in his turn, guide the destinies of many pupils. He made no great discovery, in the usual sense of the term, yet he did much more by discovering how comparative anatomy and physiology could serve the needs of surgery.

By his study of the growth of antlers in deer, he was able to demonstrate how aneurysm, then very common, could be cured by ligating the artery, thus saving both life and limb. The discovery of a principle is always more important than the discovery of a fact; it leads to more and greater discoveries. Lister discovered not merely the antiseptic value of carbolic acid, but the principle of excluding septic germs from wounds. Harvey's discovery of the circulation of the blood was a demonstration of the value of the scientific method, quite a novelty in his time. Simple observation is of no value unless imagination is used to reveal the significance of what is observed. Sherlock Holmes remarked to the naïve Dr. Watson, "You see, but you do not observe." There could be no better illustration of the value of observation than the lifework of John Hunter. What a vast gulf lay between him and his brother William, that scholarly, well-educated, and polished figure, contrasting so strangely with John, uncouth and straightforward, so full of ideas that he used to say that his head was "like a beehive."

It is not surprising that the Hunter brothers quarreled, and never repaired the breach. William was probably greatly surprised when John rose to fame, and if he was jealous, who can blame him? William did not attend John's wedding and John was not present at William's funeral. William was unmarried; John married the talented Anne Home who wrote songs, including "My Mother Bids Me Bind My Hair." Of their four children, two died in childhood. The older survivor, John, did not marry; the younger, Agnes, was twice married but had no family. Thus the direct line ended with the sudden death of John Hunter in 1793. His body rests in Westminster Abbey. Nevertheless, ability did appear again in the next generation. Dorothea, the sister of William and John, married Rev. James Baillie, and her son, Matthew Baillie, became a London physician of great distinction, while her daughter, Joanna, was a poetess whose work was praised by Sir Walter Scott.

Such is the strange story of the rise to fame of the "ne'er do weel" boy who became one of the greatest surgeons in history, undoubtedly a case of hereditary genius, of a child who was bound to become famous and who was one of those rare people who are best left alone to educate themselves. School can do little for such boys beyond teaching them how to tolerate others and how to be useful citizens. Teachers may even dislike pupils who question their statements and who propound all man-

ner of awkward problems. John Hunter was perhaps quite right to refuse to be molded to pattern, preferring to plough his lone furrow.

Besides family heredity, there is such a thing as the heredity of knowledge, from teacher to pupil. Many a teacher today can proudly point to his former scholars who have risen to occupy positions of eminence. We have noted the influence of John Hunter on his pupil Edward Jenner. Another famous teacher, Herman Boerhaave, perhaps the greatest medical teacher of all time, had among his pupils, when he was professor at Leyden in the early years of the eighteenth century, Monro, who founded the Faculty of Medicine in Edinburgh, Haller, who inaugurated medical education at Gottingen, and Van Swieten, who reconstructed the Medical School of Vienna. Other famous teachers have been the academic parents of students or assistants who attained distinction. The great Viennese surgeon Billroth had no less than 42 disciples who became eminent surgeons, and today, Sir Robert Muir, who was professor of pathology at the University of Glasgow from 1899 to 1936, is the scholastic parent of 23 professors of pathology or bacteriology in various universities throughout the world.

When we turn from those reflections on medical education and on the life of John Hunter to the career of Alexander Monro, the founder of the Edinburgh Medical School, we find an entirely different tale of the climb to fame!

THE DYNASTY OF THE MONROS

The story of the three Alexander Monros, called primus, secundus, and tertius, who in succession held the chair of anatomy at Edinburgh University for 126 years, shows that inborn talent is not the only ingredient in the recipe for success. In each case the career had been deliberately planned by the father, notably so for Alexander Monro, primus, whose father, Army Surgeon John Monro, had studied at Leyden and had resolved that Edinburgh should have a medical school conducted on similar lines. With a foresight quite unusual, he visualized his son Alexander, then 3 years old, as the instrument of his great ambition, and he planned the boy's education with the idea that he should become professor of anatomy and founder of the first faculty of medicine at Edinburgh University.

Strange to say, the plan was a complete success. But was it so strange? The Monro family could trace its ancestry back to the twelfth century, the Monros of Foulis, in Cromarty. They had money and they had intelligence. There is something to be said for vocational training from earliest childhood such as was planned for the infant Monro, primus. Is this better than the random search for a career that so many boys face when schooldays are over? John Hunter would never have submitted to a planned education, but he was reared in a very different environment from that of Alexander Monro. The attempt to control the destiny of any person is an extremely uncertain experiment, and in general, the Hunter method of self-expression may be better than the Monro method of applied discipline. Perhaps heredity is more important than environment. Who can tell? Loyalty to an age-long family tradition spurred the Monros to fame. A child's destiny may be guided by parents and teachers, and also by brothers and sisters and by fellow students or workers. John Hunter owed much to his brother William; Alexander Monro owed almost

everything to his father, John Monro. The value, to a medical student, of having a brother, or even a friend, one or two years ahead in his studies is incalculable. The older man has faced the difficulties and can advise his junior colleague better than anyone else. The younger student may be stimulated by hero worship, and it is well that he should have a pattern of life worthy to be followed. Monro had such an example in his father.

Alexander Monro, primus, born Sept. 8, 1697, received all the instruction that Edinburgh could give, supplemented by two more years of medical training at London, Paris, and Leyden. Leyden was at the height of its fame as a center of medical education, and young Monro was fortunate in being a favorite pupil of Boerhaave, for whom he would often act as interpreter when patients from Scotland or England came to consult him. One third of the students at that time were English-speaking and many were from Scotland. On his return to Edinburgh, Alexander Monro was appointed professor of anatomy and surgery, and in 1726, along with four other medical professors—Rutherford, St. Clair, Plummer, and Innes—he established the Faculty of Medicine at Edinburgh University. These five men founded a faculty that today numbers 35 members. Alexander Monro, primus, together with Lord Provost Drummond and his father, John Monro, his constant guide and advisor, founded, in 1741, the Royal Infirmary of Edinburgh in Drummond Street. The interesting experiment of educating his son from early years with a definite object in view, conducted so successfully by John Monro, was repeated by Alexander Monro, primus, whose son Alexander Monro, secundus, succeeded him in the chair.

It is not always an advantage to be the son of a distinguished father, but it was no drawback in the case of the second of the Alexander Monros.

The achievement of Monro, secundus, was even greater than that of the first Monro, at least from the scientific point of view. Monro, primus, a talented teacher and an able administrator, made no definite discovery, but Monro, secundus, who, like his father, had studied at Leyden, first described the foramen of Monro in the brain, the lymphatic channels of the body, and various other structures, besides conducting a large private practice. When Monro, secundus, retired to his house at Craiglockhart in 1808, he was, like his predecessor, succeeded by his son, Alexander Monro, tertius, specially trained for the task. But on this occasion the idea proved less successful, and the third Monro did not uphold the tradition of his father and grandfather, although he held the chair for nearly 40 years. It is said that he simply read his grandfather's lectures, a century old, and even remarked, "When I was a student at Leyden in 1719," but that story is probably apocryphal. He has often been cited as an example of failure of ability in the third generation. But there were reasons for the collapse of a career that had once showed promise.

The first two Monros had little competition to face, but in the time of the third Monro there were other brilliant anatomists engaged in teaching—John Barclay, for example, who was succeeded in 1824 by the dramatic Robert Knox. Monro, tertius, may have lost heart; certainly he was a dull lecturer in his later years. Although he had 12 children, not one of his sons was prepared to succeed him. But the hereditary ability was not extinct. One son, Sir David Monro, became a famous politician in New Zealand, and other descendants have held high positions.

We have seen, then, as exemplified in the families of the Hunters and the Monros, two very different routes of approach to the medical profession; on the one hand, John Hunter, left to educate himself, and doing so with wonderful results; on the other, Alexander Monro, apparently influenced and guided by his father from his earliest years, and very successfully. Would the results have been the same if the Monro and Hunter infants had been exchanged? Very probably they would have, as there seems to exist among the various "genes" that are transmissible a gene of the desire to learn, one of curiosity and of wonderment. If that is not already there, no amount of education can create it. There are brilliant students who will always rise to the top however steep the path and however formidable the obstacles. And this is true whether the Hunter or the Monro method of education is applied. This reflection should be of interest to parents and teachers alike.

Of course, a good home environment is of great advantage in early youth. To be reared in a physician's household is a valuable asset to any future physician, and to have free access to the means of learning is an incentive to the acquisition of knowledge. As Oliver Wendell Holmes remarked, "Happy is the child who has tumbled about in a library."

It would be interesting to discuss the motives that influence a young man or woman in the choice of medicine as a career, but that is beyond the scope of this article. Suffice it to say that the motive may arise from an interest in animals, a curiosity regarding the wonders of living matter; a desire to reduce suffering; a wish to organize public health; an interest in one's fellow beings; even the personal experience of an illness or operation—all may attract the boy or girl toward a medical career, and the example of one's forebears also plays an important part. All young people are hero-worshippers, and the hero whose pattern they desire to follow may be a physician parent or relative, a physician who may have attended them, or a famous pioneer in medicine, such as Pasteur or Lister, of whose life and work they have heard or read. Naturally all these influences should be fostered and guided by those who have the great responsibility of advising young persons in the choice of a life work. At times there is no difficulty. To some, it would appear that there is a "call" to medicine, just as there is a call to become a minister of religion. Most of us have known schoolboys who resolved to become physicians, and physicians they did become. Of course, there are physicians who say that medicine would be most interesting if only there were no patients, but even for those who hold this view there is a wide field of usefulness, as a large proportion of medical men and women today never deal directly with any patient. There is ample scope in the medical profession for those who promote health as well as for those who heal. Nevertheless, there remain, and will always remain, many problems relating to the choice of medicine as a career and to the changing needs of medical education. To the solution of these problems and to the guidance of the younger generation, the science of genealogy and the study of heredity can contribute very materially. The family tree is no mere monument of one's ancestors; it is a guide to the present generation and an incentive and example to those who plan for the future.

Medical Vignettes from Turkey

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Lokman Hekim and the Constitution of Our Organs

In the history of Turkish medicine, Lokman Hekim, or Dr. Lokman, is one of those ancient mystical figures who are part of the tradition of every nation. His counterparts have been known by different names in different places: Hermes Trismegistus by the ancient Egyptians, Danuvantari by the Hindus, Trita by the Persians, and Aesculapius by the Greeks. According to the ancient Greeks, he was the son of Apollo, the sun god. But in the Islamic world he was known as Lokman. His children were also incorporated into traditional sayings: his daughter Hygeia was considered the goddess of health and hygiene, and his son Telesphorus was the god of recovery and convalescence. Telesphorus, who also appears in Greek mythology, is considered to be the son of Lokman Hekim because the latter left many testaments and bequests to Telesphorus on his death. The various figures existed in different centuries, but there are many resemblances in the words that all these mythological healers are supposed to have said. All had similar personalities and characteristics —in fact, they were really the same person.

Lokman Hekim knew that each organ has a different constitution, and it was he who first taught that the organs should be treated as separate entities with different qualities. A folk tale about him follows.

Once Lokman Hekim performed an operation to remove a diseased organ from a patient's stomach. The intestines had come out during the operation; so Lokman Hekim said to them, "Go back in." The intestines replied, "All right," to this order and returned quietly to their place. Lokman Hekim sewed up the cut and told his patient to get up and leave, which he did. Some time later one of Lokman Hekim's assistants, who had learned to perform this operation, cut open the stomach of a patient in Lokman Hekim's absence. He removed the diseased organ from the patient's stomach and then said to the intestines, which had come out during the operation, "Go back in, please." They did not go in. The Master, Lokman Hekim, arrived and asked what had been done. He saw that the assistant was upset and confused. The assistant said, "I did the same things you did, Master. First I opened the patient and removed the organ from his stomach. Then I said to the intestines, 'Go back in, please,' just as you said. But they did not go in. I repeated it; they still took no notice. I wanted to push them in; they would not let me." Then Lokman Hekim approached the intestines and said in a harsh voice, "What is this? Get in at once." The intestines obeyed his order immediately and went back to their place.

The assistant was amazed when he saw this, but Lokman Hekim explained, "The intestines of the patient I operated on the other day were of the obedient kind," he

Fig. 1. Lokman Hekim

said, "but yours today are of the obstinate kind. Because I knew this very well, the other day I addressed them with soft words, and they did what I told them. But today's intestines obeyed only after harsh words. Each organ you treat has a different temperament, and knowing this is perhaps the most important thing for a physician to understand."

The Thermal Baths of Bursa

When the Turks settled in Anatolia nine centuries ago, they continued the baths and even perpetuated the legends that the Romans and the Byzantines had left behind them.*

From the beginning of their reign, the Seljuks took over the thermal baths, rebuilt the ruined parts, and added ponds and stone buildings over the domes in their own style. The Ilgin thermal bath, rebuilt in the middle of the thirteenth century, is one of these. Today it is still in operation, as are the others. Some of the baths have not been changed at all, but others now have some of the modern comforts.

The Turks built many thermal baths in their own style over the ruined Byzantine baths, situated on the hot springs in Bursa. The old thermal bath of Çekirge is one of these.

In one of the old thermal baths of Bursa, hot water falls from a lion's mouth, a relic of old Byzantium, into a pond. The pond is continually drained. This thermal bath has inspired the painters of our country and of Europe. In the original edition of

* Ünver, S.: Selçuk Tababeti, Ankara, Türk Tarih Kurumu Yayinlarindan, 1940.

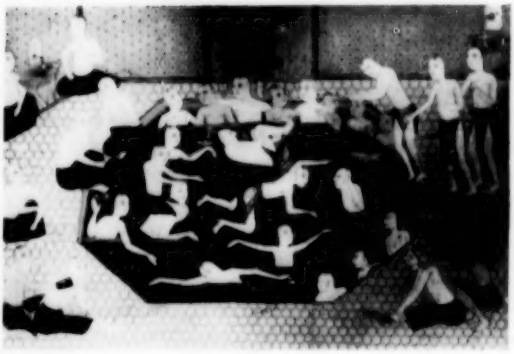

FIG. 2. Photograph of a painting of the thermal baths of Bursa by a Turkish artist of the sixteenth century.

Kanunüedünya, an encyclopedic work published in Egypt in the fifteenth century, are found pictures of the lion's mouth. Figure 2 is a photograph of a painting by a Turkish artist of the sixteenth century.

The thermal baths of Bursa are frequented for two purposes. Some persons, who have an illness such as rheumatism, come to the baths for this reason, and bathe in the morning and evening of certain days. Then they rest in the hotel that is associated with the baths. Those persons who come for this purpose could probably be cured by mere suggestion, but it is a relaxing change for them to come to Bursa.

In addition, bathing in these thermal baths offers sportive amusement for the youth of Bursa. Even to bear the hot water that pours from the lion's mouth or to race and swim in the large pond becomes a matter of amusement. Such entertainment is always popular, especially during holidays.

The city of Bursa perpetuates the old historical monuments and at the same time builds new ones, but old and young alike prefer the old thermal baths. History records that women in particular believed in the curative powers of these waters, and they related its beautiful stories and legends from generation to generation. Today women still have more faith in these thermal baths.

Insulin, Glucagon Found to Inhibit Tumor Growth

Insulin, long recognized as a successful agent in the treatment of diabetes, exhibits definite tumor growth-inhibiting action, it was reported recently in the *British Medical Journal*.

The administration of insulin alone inhibited the growth of rat tumors by 10 per cent. Tumor growth was also slowed approximately 30 per cent by administration of glucagon, reported Drs. J. M. Salter, R. De Meyer, and C. H. Best of the Banting and Best Department of Medical Research, University of Toronto. A combination of both glucagon and insulin inhibited growth in 50 to 70 per cent of the particular tumor, they said.

Medical Notes on Tibet

*Joseph Franklin Montague, M.D.**

NEW YORK, N. Y.

Tibet might be called a land of medical nihilism, for in all its broad expanse (more than a million square kilometers, in which live a population variously estimated at between three and five million people), there is not one single qualified graduate of medicine. At one time there were two physicians, one in Lhasa and the other in Gyantse, and three subassistant surgeons attached to the Sikkim troops stationed in Tibet by the British. But these physicians departed with the advent of Communist control.

As a consequence of such a vacuum of medical guidance, nowhere in the world is disease so prevalent and destructive. It is my opinion that were it not for the extreme cold, the dryness of the atmosphere, and the actinic rays of the sun at such high altitude, the entire population would long since have succumbed to the myriad diseases one finds in this region.

Physically, Tibet is a broad tableland, situated north of the Himalaya Mountains at an altitude varying from 10,000 to 16,000 feet. Most of the people live at an altitude of about 12,000 feet; perhaps 20 per cent or more live at the higher altitudes. The climate is extremely dry and cold and subject to great variations during the day, and even greater at night. Not infrequently there will be a difference of 30 C. between day and night temperatures. This wide spread in temperature accounts for the great prevalence of rheumatic diseases, but strangely enough, infectious diseases are not so common.

Because of the extreme cold and the lack of adequate means to combat it, since there is no fuel in the land other than yak dung, no one ever bathes or cleans his hands before eating, and no one ever changes his clothing until it falls apart and has to be replaced.

For the greater part of the year the Tibetans live on the second floor of their houses in rooms with no windows and where the air is filled with the smoke of yak dung fires used in cooking. The people must live on the second floor because their cattle, sheep, yaks, and horses live on the first floor. This keeps the ceiling of the first floor, which is the floor of the second, comparatively warm—the nearest approach to winter comfort that the Tibetans have.

Because of the poor ventilation, irritations of the respiratory tract are frequent and eye diseases are particularly common. Whether this is due to the continual irritation of yak dung smoke or to the strong actinic rays of the sun in summer and the equally strong action of rays reflected from the snow in winter is difficult to determine. Perhaps it is a combination of these factors, plus the constant wild wind that always seems to blow in Tibet, that irritates the human eye. And con-

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sidering also the complete absence of cleanliness, it is no wonder that trachoma is so widespread.

The action of the sun is harmful also to the skin, but this is offset to some extent by the yak butter with which the Tibetans smear their faces. Even so, carcinomas of the skin are very frequent. According to Dr. Joseph Toscano, a Catholic priest who is also a doctor of medicine, and who has spent much time in and around Tibet, there are certain diseases that seem to be more common than others. To the casual traveler, the first impression is that eye and venereal diseases are so prevalent as to almost obscure the existence of others. It is true that trachoma, conjunctivitis, and blepharitis, with attendant corneal damage and blindness, are exceedingly common. Moreover, venereal diseases affect 40 per cent of the population.

Although tuberculosis of the lung is unknown in Tibet, tuberculosis of the bone is very common, and evidences of Pott's disease and osteomyelitis are frequently seen. In regard to other infectious diseases, smallpox and leprosy are perhaps most frequently encountered. Smallpox seems to run a cycle of an epidemic, or at least has done so during the past half century. The Tibetans have evolved a natural method of vaccination from an infected cow, but the method is not in common use and vaccination is completely voluntary, with no control. The lepers are found mainly in the southern and eastern portions of Tibet.

Perhaps one reason for the widespread morbidity is the fact that Tibetans are fatalistic in their attitude toward disease. They believe that diseases are the visitation of bad spirits and cannot be avoided. They seek remedies in the prayers of the lamas, in amulets and charms, and in some cases in mysterious pills given them by the lamas. These pills, I have been told in all seriousness, are made from the feces of the temple priests—the lamas.

Curiously enough, although the Tibetans accept disease fatalistically, they are very interested in remedies from foreign countries. They are particularly eager to see and try the various medicines and remedies that come from the Western civilization. It is not that they are seriously impressed with the virtues of Occidental remedies, but the fact is that they regard our drugs as charms against the spirits, and feel that when the lamas' remedies are not successful, they are justified in seeking more powerful charms elsewhere.

Not only is water shunned as a cleansing agent, as has been mentioned, but it is also shunned as a beverage in the fresh state. The Tibetans usually drink their water boiled with tea leaves, yak butter, and salt. The one virtue in the avoidance of fresh water is that typhoid and other diseases that are transmitted by polluted water are comparatively rare.

However, intestinal infestations, particularly of tapeworms, are very frequent. Cancer is not very prevalent in Tibet, with the exception of carcinomas of the skin. Evidence of nutritional deficiencies, as well as hormone disturbances, is most frequent in the northern and eastern parts of Tibet, and is particularly noticeable in the young women, who often die at their first childbirth because of osteomalacia.

The various diseases that are transmitted by insects, such as malaria, filariasis, kala-azar, are not found in Tibet, nor are mental diseases.

In Little Tibet, Ladakh, Kashmir, and Sikh, of course, conditions are not the same

because of the difference in climate and greater contact with the outside world; in Sikh, malaria, filariasis, and other tropical diseases are widespread. In Kashmir, the river spreads itself out over the flat, alluvial plain at the base of the Himalaya Mountains in the form of huge lakes and swampy areas. This, of course, is an excellent breeding ground for mosquitos, and hence malaria finds ready carriers. Other insect-borne diseases, such as filariasis and kala-azar, occur in varying degree due to the same factors.

The land in Kashmir is, of course, far better adapted to agriculture than that in Tibet, and vegetables and fruits are grown in great quantities. However, in general, nutritional standards are still very low, and perhaps as a consequence of this, tuberculosis is very frequent among the inhabitants. Sanitary standards are greatly superior to those in Tibet, but are still very low compared to our own. As a result, there is a great deal of infection, particularly of the skin and eye.

These admittedly sketchy notes on matters of medical interest in the areas mentioned are presented with the request that they be judged in the light of two conditions that any visitor in these parts is sure to encounter. For one thing, there are no organized statistics relative to health matters, and outside of the lamasery, few records are kept. The Buddhist priests, the lamas, are looked to for information and guidance in all matters. Also, zealous note-taking is often regarded as having political implications. One has only to view the world of today to understand why such suspicions must be avoided as carefully as the sensitive, exposed nerve of a tooth. Any failure to do so might well impale one on the teeth of the law—as interpreted by officials who feel that they are acting in the best interests of their native country.

Conference on Occupational Health

A conference on occupational health in Southeast Asia will be held in Calcutta from Nov. 24 to Dec. 5, 1958. It is being organized by the Indian Ministries of Labour and Public Health, with assistance from the International Labor Organization and the World Health Organization, for the purpose of reviewing the present situation of occupational health in Southeast Asia and planning a co-ordinated program for the future. The following countries will be represented: Afghanistan, Burma, Ceylon, India, Indonesia, and Thailand.

Disease as Biography*

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The most revealing historical document on the medical progress of an epoch is not a list of its foremost figures or discoveries, but any clinical *case history* made by a conscientious physician at his patient's bedside. Hippocratic *catastases*, medieval *consilia*, Renaissance *observationes*, seventeenth century *historia morbi*, anatomicoclinical protocols by Bichat, Laënnec's clinical case histories with new "auditive" data, in brief, the history of the clinical case history—this is the most authentic form of making medical history.

The clinical case history fully reveals the concept of disease that prevailed in a given epoch and portrays the physician's search for the nature of disease. In that search nothing has been so important as the advent of the *biographical* concept of disease, which considers it a dynamic process that develops across time in the patient's life, as against the ontological concept, which considers disease an autonomous entity endowed with a natural history.

Why is this biographical concept of disease, which was strengthened by Adolf Meyer's and Freud's work, of value to the practicing physician? If the present holistic approach of treating the patient as a whole person is not enough to indicate its value, we should then recall the intriguing assertion made by the Hamburg clinician, Arthur Jores, that, of the two thousand affections known in human pathology, we know the etiology of less than half, these being precisely those that man has in common with higher mammals. The rest, of which we know the pathogenesis but little or nothing of the etiology, are *specifically human* diseases. This means that in order to solve their etiological secret we must have a greater knowledge of man. Hence the ever-increasing tendency to make of Medicine *medical anthropology*, that is, knowledge of the human being living that anomalous and painful way of life represented by disease.

Consequently, therapeutics will never again be a chess match in which by playing our pieces with mathematical precision we inexorably checkmate disease, but an effort to understand the "whole person" of the patient, his environment, and his biography, of which his disease is but one chapter. We therefore must not focus our magnifying glass on a single facet of the patient, but we must look at the whole man as if through a reducing glass.

The late Victor von Weizsäcker considered disease a "biographical crisis," and proposed dividing diseases into three groups: (a) *neuroses*, or atemporal functional disorders in the rhythm of vital phenomena; (b) *bioses*, or reversible temporal alterations in the organic structures, manifested in the individual's corporeal totality; and (c) *scleroses*, or irreversible structural modifications, representing the "historicity"

* This editorial was originally published in *MD* Medical Newsmagazine, October, 1958.

of the disease. Recently I verified that in the seventeenth century Thomas Sydenham had already classified diseases into "acute," biological or *animal* (epidemiological, we would say now), and "chronic," biographical or *human* (which we now call psychosomatic). In his turn, Karl Jaspers established the contrast between eminently *biological* and predominantly *biographical* diseases, showing again the growing tendency to create a *graphia* of the human *bios*, or a "biographical" medicine.

Today the city physician has little opportunity to learn thoroughly the person and environment of his patients, that is, their biography. On the other hand, the "country doctor," who sees his patients even more often when they are well, gradually accumulates a vast store of knowledge about them of inestimable value when he has to face the biographical accident of disease. All this is not "psychosomatic" medicine, a term so abused that, like a much-handled coin, it is all but worn out. It is simply a way to look at patients in this age of technology, statistics, and the laboratory with the same curious, penetrating, understanding, and, above all, human eyes with which over two thousand years ago a great, kindly physician looked at them in the shade of a plane tree on the sun-drenched island of Cos.

More Support for Medical Schools

The National Fund for Medical Education has established a medical research program through which contributions from community fund-raising groups, voluntary health agencies, and other organizations will be channeled into basic research. The United Community Funds and Councils of America, whose local affiliates have expressed a desire to help support broad fundamental programs of basic medical research on a national level, have agreed to support this new research program. This expansion of the program of the Fund will in no way affect its own campaign among corporations to obtain support for the teaching budgets of the accredited medical schools in the United States.

It is expected that this new program will advance the search for basic medical knowledge, encourage the training of research personnel, and help the nation's medical schools and other qualified institutions maintain a proper balance between basic and project, or applied, research. The greatest need in research today is for the support of such basic research and training. The bulk of research money available at present is for project research. Creative research—the exploratory probing and groping in the unknown—too often must be financed out of meager general funds in medical schools.

Neomycin, Its Nature and Practical Application. Edited by SELMAN A. WAKSMAN. Baltimore, Williams & Wilkins Co., 1958. Pp. x + 412. Illustrated. Price $5.00.

Here is a truly comprehensive volume on an antibiotic that has achieved a myriad of practical uses in spite of its considerable toxicity in man. Led by the Master of Antibiosis, more than 30 outstanding investigators and clinicians participated in its compilation. In considering the production of neomycin, the nutrition and genetics of the source organism, *Streptomyces fradiae*, are thoroughly described, together with methods of isolation, purification, and assay of the antibiotic. The chemical, physical, pharmacological, and antibacterial properties of neomycin are treated extensively. Its uses in experimental and clinical infections are discussed at length.

Neomycin therapy is covered in detail for many clinical indications, including enteric and urinary tract infections, peritonitis, systemic infections, skin and wound infections, intestinal antisepsis, and surgery, to mention a few. There are two valuable appendices: one summarizes the clinical uses and dosages of neomycin, and the other lists under each clinical indication the useful therapeutic preparations and their trade names and manufacturers, both domestic and foreign. Still in the experimental stages, the following uses of neomycin are discussed: as a component of pyelographic media, to control axillary odor, in soap, and for plant diseases. Of particular interest is a chapter giving formulas for preparations of neomycin in tablets, lozenges, ointments, creams, tinctures, eye-ear suspensions, nasal solutions, and other products. The book is documented with more than 700 references. This monograph is wholeheartedly recommended to students, teachers, research workers, physicians, pharmacists, and veterinarians, and to anyone and everyone interested in antibiotics in general and neomycin in particular.—*William W. Wright.*

Selected Writings of John Hughlings Jackson. Vol. 1: On Epilepsy and Epileptiform Convulsions. Vol. 2: Evolution and Dissolution of the Nervous System; Speech; Various Papers, Addresses and Lectures. Edited by JAMES TAYLOR. New York, Basic Books, Inc., 1958. Vol. 1, 500 pp.; vol. 2, 510 pp. Price $15.00 the set.

As stated on the book jacket, the purpose of these two volumes is to re-create "the development of Hughlings Jackson's thought . . . from his early investigations of convulsive seizures, through the now-famous researches into the nature of epilepsy, chorea and hemiplegia, up until his mature years, when his interests were no longer mainly diagnostic, but had come more and more to embrace the philosophical." Volume 1, *On Epilepsy and Epileptiform Convulsions*, is a selection of Hughlings Jackson's clinical papers and addresses on that subject, arranged chronologically. Volume 2 is divided into three parts: *Evolution and Dissolution of the Nervous System; Speech;* and *Various Papers, Addresses and Lectures.*

In studying this comprehensive selection from Hughlings Jackson's writings, one may appreciate the subtle workings of his penetrating, analytical mind, which, even in his most theoretical discussions, constantly strives for clarity and order. His

concepts gain force by their careful organization; for example, in discussing various uses of the terms "subjective" and "objective," Hughlings Jackson details (in 700 words) six different meanings of the terms as they might be used by "different medical men." Also, he is careful always to define the terms he uses as he means them to be understood.

Hughlings Jackson's style is terse; not a word is wasted as he plunges right into his subject, and, for example, he may begin a topic, "I speak of chronic cases," or "I begin by speaking of destroying lesions." In such a large selection, of course, there is much repetition to be found from one paper to the next, but this repetition is justified in enforcing his ideas and in strengthening their presentation.

The editor has made a judicious selection from Hughlings Jackson's numerous writings, so that the two volumes illuminate his importance in the field of neurology. The chronological arrangement of the writings in the first volume permits tracing the development of Hughlings Jackson's ideas on epilepsy and epileptiform convulsions throughout the years. The indexes for each volume are well prepared, and the copious footnotes throughout the text are legible yet unobtrusive. A list of Hughlings Jackson's writings is included in volume 2. This much-needed book is a living monument to the genius of the great British neurologist and man of science.

Medical Sociology: Theory, Scope and Method. NORMAN G. HAWKINS. Springfield, Ill., Charles C Thomas, 1958. Pp. 290. Price $6.75.

With the exception of the detailed and well-prepared last chapter on "Methods of Analysis," this book does not have much to offer either to the sociologist or to the physician. There is an adequate though somewhat cursory historical background (called "historic background" in this text) in the introduction, and the chapter on "Age and Chronicity" is not without value; however, in general the book is characterized by very poor organization and insufficient development of its subject matter. Although the author does state in his preface that he has presented merely "a sampling of the areas of interest," this sampling is much less adequate than one would expect, and the reader will find this book almost nothing more than an outline of some of the major aspects of medical sociology. There are just not enough detail and illustration included to round out the subject. If the author's purpose was merely to arouse interest of the sociologist and physician in this fairly new and increasingly important area, perhaps he has succeeded in this book; however, the reader will have to look elsewhere to satisfy this awakened curiosity.

Living with Your Allergy. SAMUEL M. FEINBERG, M.D. Philadelphia, New York, J. B. Lippincott Company, 1958. Paperback. Pp. 190. Price $1.25.

Epilepsy: What It Is; What to Do about It. TRACY J. PUTNAM, M.D. Philadelphia, New York, J. B. Lippincott Company, 1958. Paperback. Pp. 190. Price $1.25.

These paperback books, written for laymen, are the first two in Lippincott's series of Keystone Books in Medicine, under the general editorship of Edward S. McCabe, M.D.

Living with Your Allergy discusses allergy in the layman's terms. The author explains the various types of allergies and all their many causes (seasonal, nonseasonal inhalants, food, medicinal substances, contact substances). He tells the reader how to deal with allergy, stressing the importance of eliminating the cause. Also discussed are variations in the pattern of pollen hay fever throughout the country. The author explains allergy tests and their interpretation and tells why they can vary so much from patient to patient.

The volume on *Epilepsy* is exceptionally worth while for the epileptic or persons in his family—not only is it informative, but it is written in a very sympathetic and encouraging style. The author explains in simple language the major facts concerning epilepsy. He emphasizes the fact that in the past 20 years there have been major advances in treatment, so that recovery and normal life—previously rare—are now possible for some epileptics. Also, there have been advances in the public's attitude toward epilepsy as a result of increased knowledge of the disease. However, it is pointed out, there is still much to be done in devising new methods of surgical treatment and developing improved drugs for use in epilepsy. There is also much need for continued and widespread education of the public toward understanding epilepsy. The author emphasizes that it is possible in most cases for epileptics to work and that, with certain exceptions, they can safely marry and have children.

The physician will want to recommend both these books to appropriate patients, and will look forward to the third book in the series, on arthritis, rheumatism, and gout, now in preparation.

Cardiovascular Rehabilitation. Edited by PAUL DUDLEY WHITE, M.D., HOWARD A. RUSK, M.D., BRYAN WILLIAMS, M.D., AND PHILIP R. LEE, M.D. New York, Toronto, London, The Blakiston Division, McGraw-Hill Book Company, Inc., 1957. Pp. 155. Price $6.50.

Rehabilitation of the Cardiovascular Patient. PAUL DUDLEY WHITE, M.D., HOWARD A. RUSK, M.D., PHILIP R. LEE, M.D., AND BRYAN WILLIAMS, M.D. New York, Toronto, London, The Blakiston Division, McGraw-Hill Book Company, Inc., 1958. Pp. 176, with 31 illustrations. Price $7.00.

Cardiovascular Rehabilitation is a well-edited report of a conference held May 25–27, 1956, at the New York University-Bellevue Medical Center under the sponsorship of the Institute of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, and supported by a grant from the National Heart Institute, National Institutes of Health, Public Health Service, Department of Health, Education, and Welfare.

The text of the book is presented in the form of a discussion—a technique so skillfully handled that the reader feels he is present at an informal exchange of ideas on cardiovascular rehabilitation by the most eminent physicians in the field.

The most interesting chapters are concerned with work and cardiovascular disease and actual cardiovascular rehabilitation. It is emphasized that, if possible, it is best for the convalescent cardiac worker to be allowed to return to his old job after

absence due to illness. Also, the physician must understand every factor involved in a job in order to evaluate energy requirements of the worker. It is encouraging that American industry has shown increasing interest in patients with physical disabilities, say the participants.

Specific rehabilitation measures are suggested, with each participant citing from his own experience in working with various rehabilitation programs. Other chapters discuss emotions and cardiovascular disease and teaching of and research in cardiovascular rehabilitation. An excellent bibliography is included.

Rehabilitation of the Cardiovascular Patient presents a detailed description of the methods used in rehabilitation of patients with cerebral vascular disease, cardiac disease, rheumatic fever, rheumatic heart disease, congenital heart disease, hypertension, hypertensive heart disease, and coronary heart disease. From the initial total evaluation of the patient to the actual rehabilitation program in all its aspects, each procedure is described carefully and fully, with the help of many fine illustrations. The step-by-step approach makes this volume a valuable, practical guide to the physician.

The Psychology of Medical Practice. MARC H. HOLLENDER, M.D. Philadelphia and London, W. B. Saunders Company, 1958. Pp. 276. Price $6.50.

This excellent book describes a physician-patient relationship based on a psychological approach—an approach, says the author, that goes beyond simple "humanitarianism" and encompasses an understanding not only of the nature of the patient's disorder, but of his emotional and subjective orientation as well.

The author states that he does not intend "to provide cookbook-like recipes . . . [but] rather to evolve general principles and to illustrate an approach." This he does in a manner certain to aid the physician in deciding how much to tell a patient about his disease, how and when to tell him, what to tell the relatives. Suggested approaches to these and many other factors involved in the patient's emotional response to his situation are described by use of case histories and even illustrative dialogues. However, the numerous specific instances cited are only exemplary, for, as is emphasized throughout the book, the physician must "individualize." He must analyze each particular patient and situation to understand the psychological factors involved. And he should disregard dogmatic rules of "never" or "always" in deciding whether to tell a patient he has a fatal disease or in any other situation.

This exceptional book is an invaluable text for every physician.

Practical Clinical Psychiatry. JACK R. EWALT, M.D., EDWARD A. STRECKER, M.D., SC.D., LL.D., AND FRANKLIN G. EBAUGH, M.D. Ed. 8. New York, Toronto, London, The Blakiston Division, McGraw-Hill Book Company, Inc., 1957. Pp. 457. Price $8.00.

This volume is the eighth edition of a class textbook first published in 1925. The new edition is comprised of three sections: The first section, on "Basic Concepts," is concerned with theoretical material, basic mental mechanisms, and psychobiology. Section 2 describes "The Clinical Syndromes"—their symptoms, pathology, and

treatment. The text follows the classification system of the American Psychiatric Association. In certain cases the authors disagree with this classification but follow it in order to avoid confusion. In the third section, "The Treatments," are discussed psychotherapy, group therapy, psychoanalysis, environmental manipulation, drug therapy, shock therapies.

This comprehensive text is recommended for both the student and the practicing physician.

Tuberculosis: Every Physician's Problem. J. ARTHUR MYERS, M.D. Springfield, Ill., Charles C Thomas, 1957. Pp. 290. Price $7.50.

Modern Drug Treatment in Tuberculosis. J. D. ROSS, M.B., CH.B., F.R.C.P.E., M.P.H. (JOHNS HOPKINS). London, National Association for the Prevention of Tuberculosis and Diseases of the Chest and Heart, 1958. Pp. 47. Price 5s.

Although the tuberculosis mortality and morbidity rates have been reduced throughout the past decades, there is still a case rate of approximately 30,000 per 100,000 population. The eradication of tuberculosis is the problem of every physician, emphasizes Dr. J. Arthur Myers in *Tuberculosis.* And since it is of no avail to eradicate tubercle bacilli in human beings and not in animals, and vice versa, physicians and veterinarians must cooperate in this program.

Early diagnosis is the all-important aspect of tuberculosis eradication, which has replaced tuberculosis control as the goal. And thus the role of every physician lies in identifying as early as possible all persons harboring tubercle bacilli.

The presentation is objective, factual, but forceful and dynamic. The author discusses diagnosis, treatment, and prevention of the various types of tuberculosis, and then leads into his recommendations for an offensive attack for eradication of the tubercle bacillus. The chapter summaries are helpful in accentuating the author's themes, and numerous charts and illustrations add to the value of the book.

Modern Drug Treatment in Tuberculosis is a concise review of current drug therapies for tuberculosis. In addition to discussion of treatment with the standard drugs (streptomycin, dihydrostreptomycin, para-aminosalicylic acid, isonicotinic acid hydrazide), a summary of "salvage" chemotherapy (drugs used only when a patient's organism is resistant to two or more of the more common therapies) is included.

Although useful as a handy reference—the pamphlet was prepared primarily for nurses working in a tuberculosis sanatorium or a tuberculosis ward of a hospital—the booklet is too abbreviated to have broader merit.

The Analysis of Dreams. MEDARD BOSS, M.D. Translated by Arnold J. Pomerans. New York, Philosophical Library, Inc., 1958. Pp. 223. Price $6.00.

The unique hypothesis of this book is a phenomenological analysis of dreams, an existential analysis that accepts dream phenomena as existing in their own right, rather than as symbols and archetypes. In contrasting such analysis with Freudian or Jungian interpretation of dreams, on an objective or subjective level, Dr. Medard

Boss throws doubt on both these theories and on the "neo-analytical" theories. Dr. Boss hypothesizes that if dreams are understood in their full phenomenal state, they may reveal to man the actual measure of his life, whereas the older dream interpretations would not be so helpful to the patient.

Dr. Boss says that "dreams cannot be divorced from man as mere objects. . . . [Man] when dreaming, no less than when awake, always exists in his relationships with things and with people. . . . [These] relationships go to make up his entire existence. . . . [Man] can realize his existence in dreams, just as in waking life, through the most varied relationships and attitudes." ". . . we cannot consider dreaming and waking as two entirely different spheres . . . ," he emphasizes. ". . . we must recognize the dream as a form of human existing in its own right, just as we call the waking state a particular form of man's life."

The author examines in detail a particular dream of one of his patients and shows why he feels it is inadequate to analyze this dream according to current doctrines. He goes on to discuss various aspects of human life in other dreams.

The unusual theories presented in this book may have interest because of their novelty, but further clarification is needed if they are to be well understood, much less accepted. Dr. E. B. Strauss, former president of the British Psychological Society, states it very well in his "Foreword": "Nevertheless, in the last analysis, is there so very much difference between the full experiencing of 'selfhood,' which would appear to be the ultimate object of Professor Boss's type of psychotherapy, individuation, the object of Jungian analysis, and the resolution of unconscious, instinct-derived conflicts and the achievement of an appropriate adulthood thereby, which is the desired goal of Freudian analysis?"

Existence: A New Dimension in Psychiatry and Psychology. Edited by ROLLO MAY, ERNEST ANGEL, AND HENRI F. ELLENBERGER. New York, Basic Books, Inc., 1958. Pp. 445. Price $7.50.

Overcoming great difficulties in translation, the editors and translators of this book have presented a group of fundamental writings by the pioneers in a new movement in psychiatry and psychology—existential analysis. The selections include both thorough discussions of the theoretical bases of the movement and long case histories illuminating the application of the concepts of existential analysis. It is to the credit of the translators that the English translation—even of the many recondite passages—is for the most part intelligible to the reader.

In contrasting existential analysis and psychoanalysis, Ludwig Binswanger, one of the leaders of the new movement, explains: "The one [existential analysis] is the phenomenological, which devotes itself to the phenomenal content of every verbal expression, every mode of action, every attitude, and attempts to understand it from basic modes of human existence prior to the separation of body, soul, and mind, and of consciousness and unconsciousness; and the other [psychoanalysis] is the objectifying natural-scientific one, which according to Freud himself subordinates phenomena to the 'hypothetically postulated strivings,' investigates the verbal content not with respect to the world-design which emerges in it, but with respect to those

strivings or 'natural' instincts, and which thus projects the being of man upon the conceptual level of the being of 'nature.' " Existential analysis, although recognizing many of the Freudian concepts, e.g., anality and orality, opposes the psychoanalytical interpretation of them.

Existential analysis is an "anthropological type of scientific investigation," "anthropological" here being understood to mean "the study of man . . . and specifically . . . the study of the essential meaning and characteristics of being human." A phenomenological study of the many aspects of the life of a human being may lead to a better understanding of the manifestations of mental illness. Existential analysis, say its spokesmen, facilitates communication and empathy between the psychiatrist and the mentally ill by providing knowledge of the "worlds" in which such patients live.

A major contribution of this book is a fine translation of Dr. Binswanger's "The Case of Ellen West." This paper, of primary importance as his first study demonstrating the application of principles of existential analysis to psychiatry, had been considered untranslatable because of its complexity, particularly with regard to subtleties in meaning of German words, e.g., *weich, zart, dick.*

The contributors to this volume acknowledge that existential analysis is not yet completely and finally formulated and that there remains room for improvement. Also, they do not claim infallibility and recognize that just as in other areas, "there do occur errors, dead ends, premature interpretations," but these mistakes may be rectified.

The concepts presented in this very interesting book will be unfamiliar to most American readers, and probably not many of them will accept this approach solely on the basis of one book, however noteworthy it may be. Nevertheless, the reader who takes the trouble to study this difficult volume will be sure to find in it a really constructive attempt on the part of its leaders to clarify this new movement.

Animal Disease and Human Health. Edited by OTTO V. ST. WHITELOCK. Annals of the New York Academy of Sciences, vol. 70, art. 3, June 3, 1958. Pp. 277–762.

This monograph of 486 pages comprises a series of papers resulting from a conference on "Animal Disease and Human Health" held in New York City, Sept. 11 to 13, 1957, by the New York Academy of Sciences in collaboration with the Communicable Disease Center, Public Health Service, Atlanta, Georgia. The papers deal primarily with domestic viruses that belong to the group of arthropod-borne zoonoses and represent the progress that has taken place in this field since the Academy's earlier publication, *The Relation of Diseases in the Lower Animals to Human Welfare*, in 1947.

Part I of the monograph, "The Viral Encephalitides," presents reviews of previous work and summaries of current work in the field of viral encephalitides; part II deals with "Other Problems in Virology." Part III, "Leptospirosis: A Contemporary Problem," Part IV, "Recent Developments in the Epidemiology of Rabies," and Part V, "Ornithosis," all present the reader with the latest information on these important diseases. Diseases such as brucellosis, Q fever, cat-scratch fever, and

many others are reviewed in part VI, "Other Contemporary Disease Problems," with accompanying progress reports on their diagnosis and control. Diseases not included in the category of "zoonoses" are discussed in part VII, "Selected Chronic Diseases," from the standpoint of their possible relationship to similar conditions in man. Papers dealing with global activities are presented in part VIII, "International Programs."

The subject matter is balanced between those topics of practical importance to human and veterinary medicine and those of scientific value to research in the life sciences. Valuable technical information is provided. The contributors concern themselves not only with the acute communicable diseases but enter into the comparative pathology of certain chronic diseases and the chronic sequelae to infectious diseases in animals that are histologically similar to those in man. In each instance, the topics are discussed by persons well versed in their respective fields. Although the subject matter selected does illustrate the interrelationship between animal and human disease, a subject as diversified as this can hardly be dealt with adequately in a publication of this size. The publication should prove very useful to the professions of the medical sciences and would be a valuable addition to scientific libraries.—*LaVerne C. Harold.*

Medical Electrical Equipment: Principles, Installation, Operation and Maintenance of Electrical Equipment used in Hospitals and Clinics. ROBERT E. MOLLOY, M.B., F.F.A., R.C.S., Advisory Editor. New York, Philosophical Library Inc., 1958. Pp. 312, with 238 illustrations. Price $15.00.

Proper maintenance and operation of the electrical equipment used in a hospital are necessary for the safety of patients and staff. This thorough, informative book, written by a group of competent British contributors, explains general principles concerning use of electrical equipment and then discusses hospital illumination, air conditioning and refrigeration, roentgenographic apparatus, and many other types of equipment.

The book contains many fine diagrams and illustrations, and it is so clearly written as to be understood by every technician and physician.

Dynamic Psychopathology: An Introduction. THOMAS F. GRAHAM, PH.D. Boston, The Christopher Publishing House, 1957. Pp. 251. Price $5.00.

The intended objective of this textbook is threefold: academic, cultural, and professional. Unfortunately, the book does not succeed on any of these levels, for it is so rudimentary that it provides only the most basic introduction to the study of psychopathology. At best this volume is merely a dictionary of pertinent terminology, a sketchy outline of what might be included in the ideal text. It is especially unfortunate that the goals are not realized in this volume since it has two features important in every college text—it is up to date and it is written in language easy to understand yet on a level suitable to the subject.

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